Building Code, Building Relationships

Adrienne S. Brown

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Building Code, Building Relationships

By
Adrienne Brown
Master of Fine Arts

Herron School of Art and Design
IUPUI
Indiana University

Youngbok Hong, Associate Professor
Advisor

Aaron Ganci, Assistant Professor
Committee Member

Pamela Napier, Assistant Professor
Committee Member

Accepted: August 2016

Professor Valerie Eickmeier
Dean of Herron School of Art and Design

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Date

BUILDING CODE,

BUILDING RELATIONSHIPS

Using a People - Centered Design Methodology to Affect the Hackathon Team Experience

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BUILDING CODE,
BUILDING RELATIONSHIPS

Using a People - Centered Design Methodology to Affect the Hackathon Team Experience

Adrienne Brown
Design Researcher

Youngbok Hong
Associate Professor of Visual Communication Design
Committee Chair

Aaron Ganci
Assistant Professor of Visual Communication Design
Committee Member

Pamela Napier
Assistant Professor of Visual Communication Design
Committee Member


POLSKA

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Aaron Ganci
Pamela Napier

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And last but not least, thank you, with all my heart and then some, to my ever-loving, supportive, inspiring, uplifting, wise, and flexible family and friends. Thank you for being you and allowing me to be me. I love you all! Thank you for allowing me to accomplish my dreams!

ABSTRACT

Hackathons are popular and innovative events organized to develop ideas related to a technological solution into prototypes in a short amount of time. There have been thousands of hackathon events held since their inception in the late 1990s. This thesis research explores how a people-centered design approach can be used to develop a team-building process or tool for shaping a meaningful hackathon experience.

Literature suggests that interdisciplinary teams encounter challenges when attempting to build relationships in teams. Those challenges include communication and collaboration and are amplified due to the short working time frame of most hackathons. Exploring key factors that affect teams in hackathons and ways to mitigate those barriers is a challenge to identify in literature.
Participatory design research methods are used to develop processes and tools that will encourage relationship-building between hackathon team members, particularly those who are new to hackathons or are unfamiliar with their team members. The goal of a people-centered design approach is to co-create an outcome that can be used at numerous hackathon events and potentially in additional contexts that require interdisciplinary collaboration.

The results of this research include an effective team-building process for hackathons and a co-created tool in the form of a mobile application. The proposed team-building process is four steps: Introduce, Discover, Form and Collaborate. Hackversation, a mobile app, encourages individuals to connect and communicate with each other, based on their common interests. The app also recommends potential teams based on participants' challenge interest and requests for particular skill sets.

Keywords: people-centered design methodology, participatory research, co-creation, hackathon, team-building, mobile application

1.0 INTRODUCTION

In recent years, hackathons have become more popular in industry and academia. In 2011, it is estimated that over 200 corporate, academic or civic-based hackathons were held in the United States alone (Leckart 2012). In November 2015, at the Center for Social Innovation in New York City, AT&T sponsored a mobile hackathon to inspire 150 participants to create innovative applications using the Alcatel-Lucent Rapport Call Management APIs and Microsoft Azure (AT&T Intellectual Property 2015). At the University of Pennsylvania, organizers created a hackathon within a hackathon: StitchFest, focusing on wearable technology, as part of the larger hackathon PennApps (Richard et al. 2015).

One thing that all these hackathons have in common, individuals come together as an already formed team or with the intent of forming a team. For new hackathon attendees, team-building can often lead to various challenges, or barriers, that impede the ability to build camaraderie between team members and achieve a desired goal. A people-centered design research methodology can enable researchers to discover processes and tools that will assist in overcoming team-building challenges at hackathons.

2.0 LITERATURE REVIEW

2.1 Team-building

Defining Team-building

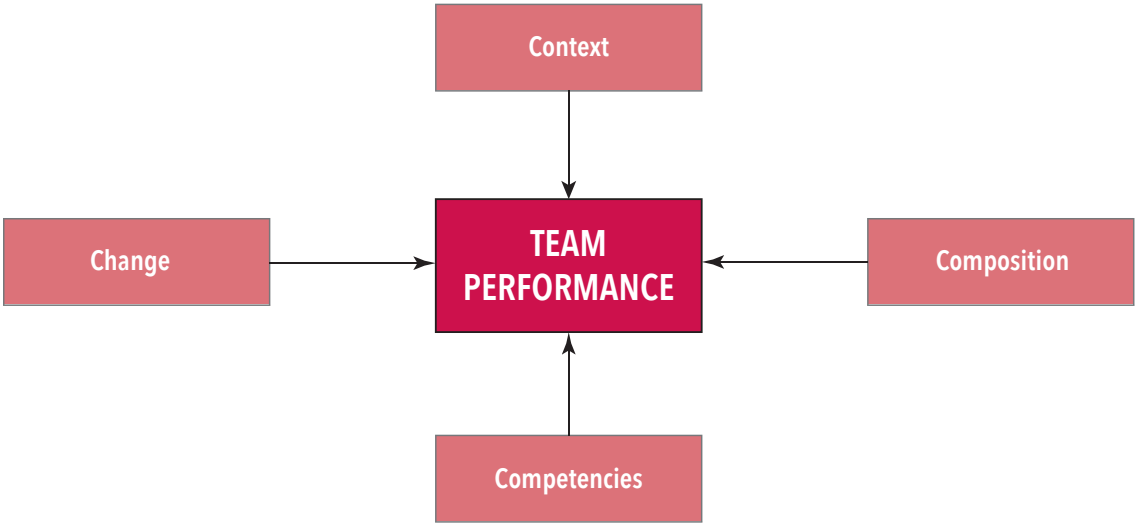
Successful team-building is an important foundation for most organizations. Without strong relationships between team members it's hard to move forward in set goals. Klein et al. (2009) define team-building as formal and informal team-level interventions that focus on improving social relations and clarifying roles, as well as solving task and interpersonal problems that affect team functioning. The goals of this research are to explore key factors and process models that influence team-building and create a process model and tool that would be appropriate in a hackathon context. This research intends to explore challenge areas common to team-building for individuals who have little to no hackathon experience, using a people-centered design methodology. The desired outcome is a process and a tool that will assist team members to build relationships with each other, thus enhancing their hackathon experience.

Key Factors

The purpose of team-building is to ensure that a team can perform at a certain level and is typically a process used in work organizations for its employees. Team-building is strongly emphasized in the industrial sector. Techniques for team-building can be transferable to other contexts, such as healthcare, education, and government. Team-building processes include many factors that are influential to a team performing to a high standard. Dyer et al. (2013) articulate "Four Cs" for high team performance. These four factors are to be understood by all team members in order for there to be team success: context, composition, competences, and change.

The Four Cs of Team Performance

(Dyer et al. 2013)



Context

The need for teamwork, type of team needed, and the culture, structure and systems that support teamwork

Composition

Team members' skills, experience, and motivation, as well as team size

Competencies

The team's ability to solve problems, communicate, make decisions, manage conflict, and so on

Change

The team's ability to monitor its performance and make changes as needed

Team-building Process Model

Key factors, such as the Four Cs for Team Performance, are important to team-building because they enable leaders to develop team-building process models that are appropriate to organizational environments. Social scientists use a multitude of team-building process models to achieve success in team-building. Quick (1992) identifies one team-building process model with five distinct stages for building a team.

Five Stages o f Team-buildin g

(Quick 1992)

STAGE 1: Searching

Identifying why the group has formed and what is the expectation of roles and accomplishment of tasks

STAGE 2: Defining

Focusing on defining the objective of the group and the roles

STAGE 3: Identifying

Team members work to identify what is their service to the group

STAGE 4: Processing

Team members evaluate how well their work is contributing to the group objective

STAGE 5: Assimilating / Reforming

Focuses on redistributing work per a membership change, or mourning the end of an experience if the group disbands

Looking at the key factors and stages of team building, as seen in the table below, Quick's five stages can be aligned with the four factors of Dyer et al.

Five Stages of Team-building (Quick 1992)	Four Cs of High Team Performance (Dyer et al. 2013)
Searching, Defining	Context of the team
Identifying	Composition of the team
Processing	Competencies of the team
Assimilating / Reforming	Change management skills of the team

Team-building Activities: Search and Define Stages

Once key factors and process model for team-building have been established, the team should execute -predetermined activities to assist with forming bonds between team members. Activities created for building relationships within teams allow individuals to accomplish essential functions such as greeting perspective team members, identifying strengths and weaknesses, and creating bonds as a unit. These types of activities can be as simple as an ice breaker or as complex as a multi-day workshop or retreat.

The activities conducted for team-building The editorial staff at the website "Mind Tools" identify several team-building activities, similar to traditional ice breakers. One activity, called "Back-to-Back Drawing", is used to improve communication; teams are broken up into pairs, where one person is responsible for the images and the other is tasked to draw the image, typically a shape. The image person is responsible for explaining characteristics of the shape, without sharing exactly what is the shape (Mind Tools).

It is not uncommon for teams to use technology for team-building activities, moving away from more traditional methods, such as ice breakers face-to-face. Wolfe and Sparkman (2010) declare numerous digital team-building activities, such as "Mirror, Mirror, On the Wall", where individuals take the perspective of a stranger to identify what are their interests, what are they known for and what do they value. Another digital activity is called "Speed Texting", much like the game of telephone, where people whisper a phrase and see how the phrase morphs into something different by the time it gets to the last person in a group. In "Speed Texting", groups have instructions on pieces of paper, that they must communicate to the person next to them via text and the person who receives the text must conduct whatever activity has been texted to them. The intent of the activity is to highlight the "difficulties inherent in communication" (Wolfe and Sparkman 2010).

The focus for team-building activities is to bring individuals together in a supportive environment that encourages collaboration. Team-building activities should lead teams working together to achieve success in the implementation of a set goal.

Activities

Process Model

Key Factors

Team-building

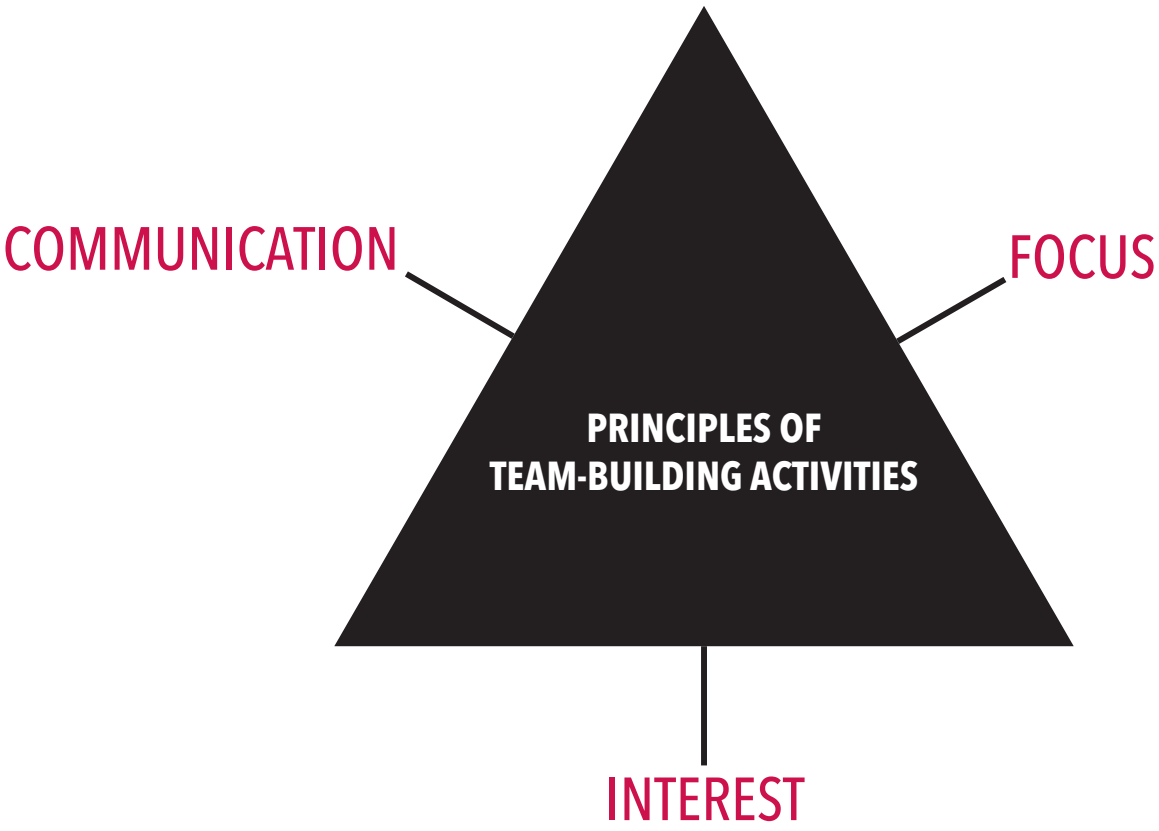
Principles of Team Building Activities

In the aforementioned activities, three main categories, or principles of team-building, stand out: communication, focus, and interest. Effective communication, like the Four Cs, contributes to team performance. If the communication between team members is poor, it can be difficult for the team to achieve the goal at hand. Activities that encourage team members to communicate allow members to learn each other's communication styles and understand the dynamics of the team.

A well-established focus for the activities encourages collaboration on a specified topic. A challenge in group work is making sure everyone works on the same topic and select team members don't try to go off and do their own thing. Activities that allow a team to focus on one topic prepares the team to work in a similar fashion when the time comes to address and work towards their team goal.

Activities that highlight team members' interest in roles, objective, and tasks will engage them, leading to greater commitment to complete assigned tasks. The aim of most teamwork is to achieve completion through the implementation phase; activities that pique the interest of team members allow them to see what roles and/or tasks they may excel at and apply that expertise to an appropriate area for team work.

These three principles are key for people attending and participating in a hackathon. But first, what is a hackathon?


COMMUNICATION
FOCUS
PRINCIPLES OF
TEAM-BUILDING ACTIVITIES
INTEREST

2.2 Hackathons

History of Hackathons

There are many, closely-related definitions of hackathon. Komssi et al. (2002) define hackathon as a word combining "hacking" and "marathon", a practice characterized by an intense period of time spent programming to create a software prototype. Similar to the definition provided by Komssi et al., Briscoe and Mulligan (2014) describe a hackathon as a problem-focused computer programming event, as well as a contest to pitch, program, and present instances of prototype digital innovation (e.g. a prototype mobile application). Both of these definitions speak to the programming, or coding, aspect of a hackathon. Over the years, hackathons have been "ingrained into the very essence of coding, but given a formal name only fairly recently; today's version of a hackathon emerged during the late 1990s" (Calco and Veeck 2015). In the sixteen plus years since the first hackathon occurred in Canada, hackathons have evolved to include a range of industries in technology, including healthcare, non-profits and sports (Government Technology 2015. One could also think of hackathons as "a desire to build design thinking methodologies into digital media products and services". (Lochman 2014)

In 2011, it is estimated that over 200 corporate, academic or civic-based hackathons were held in the United States alone (Leckart 2012). In November 2015, at the Center for Social Innovation in New York City, AT&T sponsored a mobile hackathon to inspire 150 participants to create innovative applications using the Alcatel-Lucent Rapport Call Management APIs and Microsoft Azure (AT&T Intellectual Property 2015). At the University of Pennsylvania, organizers created a hackathon within a hackathon: StitchFest, focusing on wearable technology, as part of the larger hackathon PennApps, which focuses on real-world problems (Richard et al. 2015). Hackathons can be more than an event only to create a technological output, but also a team building event where the output is a concept or an idea (Phipps 2014).

Ideation

One of the key concepts of a hackathon is that teams create ideas that (typically) lead to technological solutions. There is also motivation to "facilitate the circulation of important knowledge, such as the […] community's priorities, technical know-how, and social connections" (Trainer and Herbsleb 2014). The creation and sharing of ideas has the ability to "build a sense of common identity and create networking opportunities by bringing together [participants] who may otherwise be dispersed or weakly connected" (Munro 2015). Hackathons provide an environment for "interdisciplinary teams [to learn] more about one another's work style, language, conventions, and expertise" (Trainer and Herbsleb 2014).

Community / Network Building

Ideation is one key outcome created at hackathons; hackathons also provide a foundation for community-building and networking. Trainer and Herbsleb (2014) state that a common identity is important because it can jump start opportunities for networking and collaboration. Hackathons hosted on university campuses can be used to "increase our students sense of community but perhaps draw in some undeclared majors" (Munro 2015) for departments struggling to keep student numbers up. One university hackathon, StitchFest, had a "goal to broaden participation by recruiting within affinity networks, promoting new designs with computation, developing new models for collaborative hacking, and impacting perceptions of computing participation" (Gabriela et al. 2015).

The idea of making hackathons more inclusive as a way to build community is growing, especially since diversity in tech fields is deficient and many organizations work towards increasing the number of women and minorities in technical positions. Richard et al. state that despite their open nature, female participation in major coding competitions has historically been lacking, but can be redesigned to [diverse populations and perceptions]. Ultimately, hackathons are a way for people to interact with others. The "social interactions are in fact a key reason that many decide to spend a full weekend of non-stop hanging out together" (Gabriela et al. 2015).

Social Impact

While a hackathon may encourage social interactions, it also has the potential for making a social impact. While the goal of this research is to identify design research methods that can be used to create processes and tools to encourage team-building between hackathon participants, hackathon participants can think about how design processes and methods factor into the development of their product aimed at the end user, particularly in the case for civic engagement.

Local, state, and federal governments are positioning "civic hackathons as an effort to engage the public in two ways: first, the hosting of a participatory event, and second, through the creation of new apps designed for citizen use, based on government open data" (Johnson and Robinson 2014). Civic hackathons are a way to build their social networks and create a social impact using open data provided by the government. These hackathons "tap into the current zeitgeist of social innovation and entrepreneurship by connecting civically minded hackers and coders to governments seeking to present a more open, transparent, and connected face to their citizenry" (Johnson and Robinson 2014).

A case study in 2014 details a federally sponsored Canadian Open Data Experience (CODE) hackathon winner who developed an app called newRoots, designed to help new immigrants and current residents to find a new neighborhood that matches their employment interests with housing availability and presence of specific ethnic communities (Johnson and Robinson 2014). According to the website (www.canadianopendateexperience.com) , it was the largest hackathon in Canadian history. The winning group who developed newRoots were part of a pool of 15 top finalists that presented their applications to judges.

Challenges at Hackathons

The hackathon environment is a physical parallel of a "wicked problem". Crouch and Pearce (2012) define "wicked problems as problems that are so complex that they have no single solution, are in fact never solvable, and require continued research in order to be kept within our understanding. The complex proposed hackathon challenges have more than one solution, yet teams work towards a product that meets the stated needs of the challenge owner. Despite dealing with complex challenges, there are multiple benefits of hackathons including bottom-up and externally collaborative ideation, encouragement to do things differently and building community and networks between participants (Calco and Veeck 2015). Comparable to the presence of benefits, there are also challenges that hackathon teams encounter, such as collaboration and communication.

Collaboration + Communication

Researchers recognize team challenges, such as "the importance of assessing not only a team's technical skills but also its competency in such areas as team building, group dynamics, conflict resolution and group communication skills" (Cianni and Wnuck 1997). In the article by Komssi et al (2002)., five hackathons organized or involved in by F-Secure, an online security and privacy company based in Helsinki, Finland, had several "challenges faced" by participating teams.

One hackathon team had formation challenges including "a slow start due to team dynamics and technological barriers". Another team's barriers included "language issues" as well as technological difficulties. Teams at another hackathon stated "difficulties agreeing on intellectual property rights (IPR) and team formation in a multicompany setup" (Komssi et al. 2002). All the teams reported having an initial challenge of some form of communication.

Hackathons by their nature encourage team work and those teams rely on clear, concise communication amongst members in order to bring the project to fruition (Aungst 2015). Holton (2001) refers to a challenge of team building as a difficulty in "creating avenues and opportunities for team members to have the [...] depth of dialogue necessary to create a shared future". Additionally, Holton (2001) submits that "through deep dialogue […] we can learn to suspend our assumptions and judgments, actively and attentively engage in listening to others and reflect individually and collectively upon the ideas and thoughts that emerge. The abandonment of goals for self, is a main goal in Quick's first two stages of team-building, so that the goals of the team can be paramount.

Effective communication can help to alleviate the pressure of forming a team that will work well together. Finding team members that share personal interests or have the right mix of skill sets requires every team member to communicate in an effectual manner. Communication challenges rise to another level when gender is added to the equation. Many are familiar with the book "Men are from Mars, Women are from Venus", which speaks to the different communication styles of men and women. While men tend to be the main attendees at hackathons (a true reflection of the limited number of women in the tech field), in the event of a gender-diverse team, "it has been scientifically proven that men and women communicate differently, causing friction between the two groups" (Wee-Ellis et al. 2014). When teams are able to communicate well with each other, the collaborative nature of the team can increase.

Komssi et al. (2002) also speak about challenges encountered with collaboration. At times when a hackathon is held, participants form teams of total strangers. Holton talks about how when new teams are formed, building the personal interaction is not easy or natural (Holton 2001). Pressures of time and resource availability only add to potential low performance from team members (Reece 2015). Strong team leadership is necessary to facilitate team discussions; Novello believes a "the team leader's failure to guide and structure team experiences to facilitate coordinative, adaptive actions can be a key factor in poor team performance" (Novello 2015). Definition of team roles refers back to important stages in team-building, per Quick and Dyer et al.

2.3 People-centered Design

People-centered design methodology is based on processes that focus on collaboration between diverse individuals. Design Researchers apply research methods to engage stakeholders to define problems, identify opportunities, and implement solutions. A challenge in conducting people-centered design research is identifying design research methods that will engage participants appropriately for creating a solution to an identified problem. This research shows how a people-centered design process can be applied to team-building processes and allows potential team members to engage with each other for creating processes and tools. The hypothesized outcome are processes and tools that can enhance the hackathon experiences for newbies and un-teamed participants.

Why People-centered Design?

Team-building as a process has an important resource at its core: people. As a result, a collaborative, engaging methodology is the necessary to work towards addressing the challenges that plague teams, particularly at hackathons. The best-suited methodology to follow is people-centered design.

People-centered design (PCD) has a variety of nomenclature: human-centered design, user-centered design, customer-centered design, etc. Simply put, PCD is a people-centric approach to designing a system or product that meets the needs of the intended audience.

Characteristics of PCD

In order to accommodate solving "wicked problems", a methodology needs to have robust and well-defined characteristics. People-centered design is capable of fulfilling that requirement. Three main qualities of PCD are inquisition, action and reflection. These three qualities contribute to a holistic approach to uncovering appropriate, people-centric solutions

In order to confirm the validity of a problem, a design researcher must engage in a process of inquiry. Often, this includes identifying a design lens and formulating a research question based on the assumed issue. Creswell and Miller (2010) describe a [design] lens as a viewpoint for establishing validity in a study. The design lens for this research is people-centered design. People-centered design allows design researchers to facilitate active research which is helpful in addressing "wicked problems".

Designers traditionally were tasked to create a representation of a product and receive feedback from other designers or creative directors about aesthetics and color. People-centered design shifts that design mindset, with designers actively engaging with stakeholders, often working together to create an outcome; this type of collaboration is called co-design. Crouch and Pearce define co-design as "a shorthand phrase used to cover a variety of design activities that all share the basic principle that the design process includes other participants, either individuals or communities, in the process of designing a solution to the problem" (2012). Co-design is another way to describe participatory action research.

Reflection is an component in participatory action research, because it allows design researchers and stakeholders to learn from the process followed in achieving results and modify that process as necessary for additional iterations of the outcome. Sociologists Anthony Giddens and Pierre Bourdieu have their differing interpretations of reflexivity. "Giddens uses the term reflexivity to describe the process of learning about who we are and or creating our identity. Bourdieu uses it as a way of trying to ensure that social scientists are aware that the subjective cultural position the individual holds may influence the way in which he or she understands new information" (Crouch and Pearce 2012). Reflexivity allows designers and participants to examine where they fit within the problem context and determine how their distinct viewpoint contributes to the final solution.

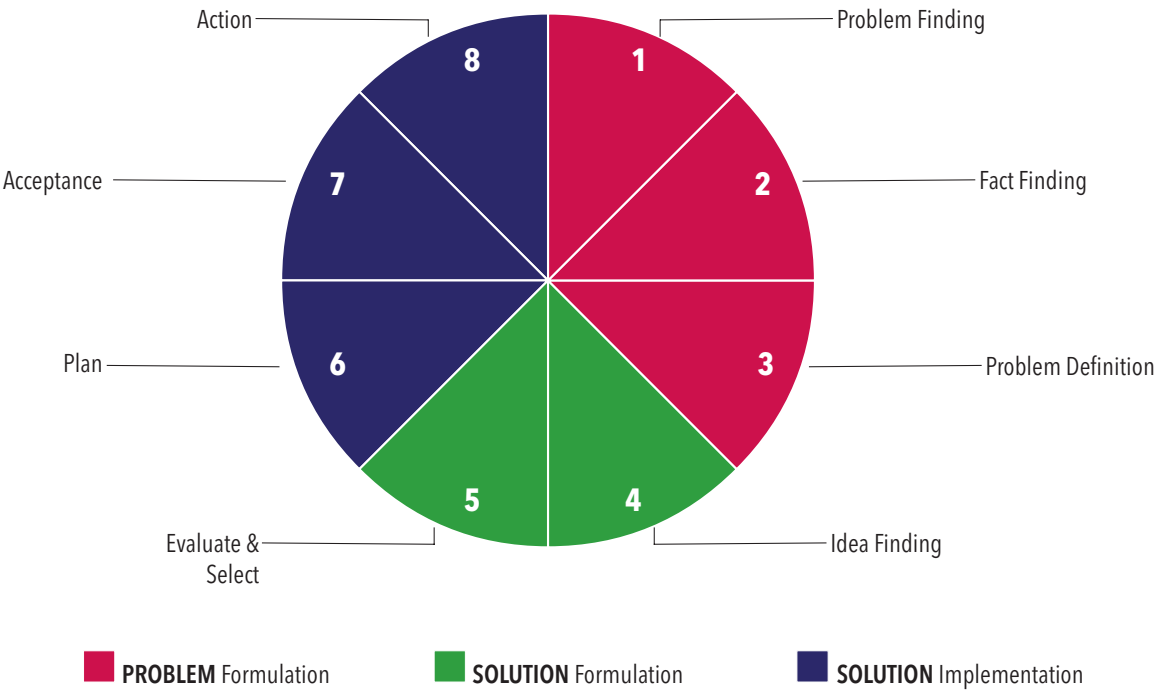
3.0 DESIGN RESEARCH METHODOLOGY

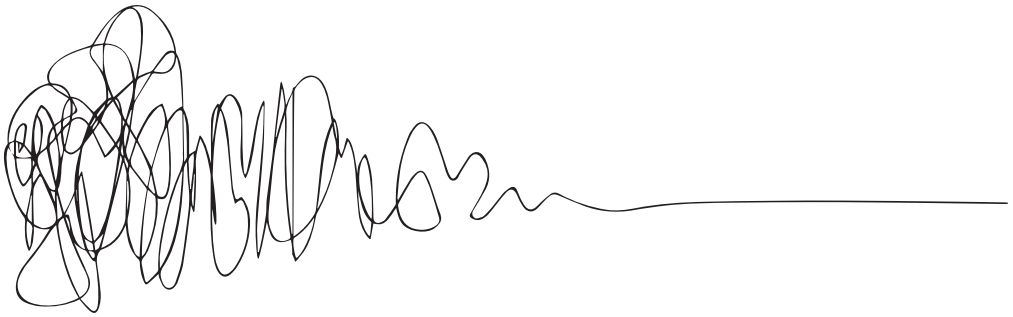
Initial Research Question

The initial research objective was to explore how service design methods can be used to develop solutions with the objective of assisting people communicate their needs, goals and intent as it relates to work on an interdisciplinary and collaborative team working in a technical environment, i.e. a hackathon in this case.

Service design is the activity of planning and organizing people, infrastructure, communication and material components of a service in order to improve its quality and the interaction between service provider and customers. The purpose of service design [methods] is to design according to the needs of customers or participants, so that the service is user-friendly, competitive and relevant to the customers. (Service Design Network 2015). The initial research intent was to overcome team challenges by increasing communication and collaboration.

Simplex Process (Basadur 1994)





Uncertainty

3.1 Thesis Research Design Methodology

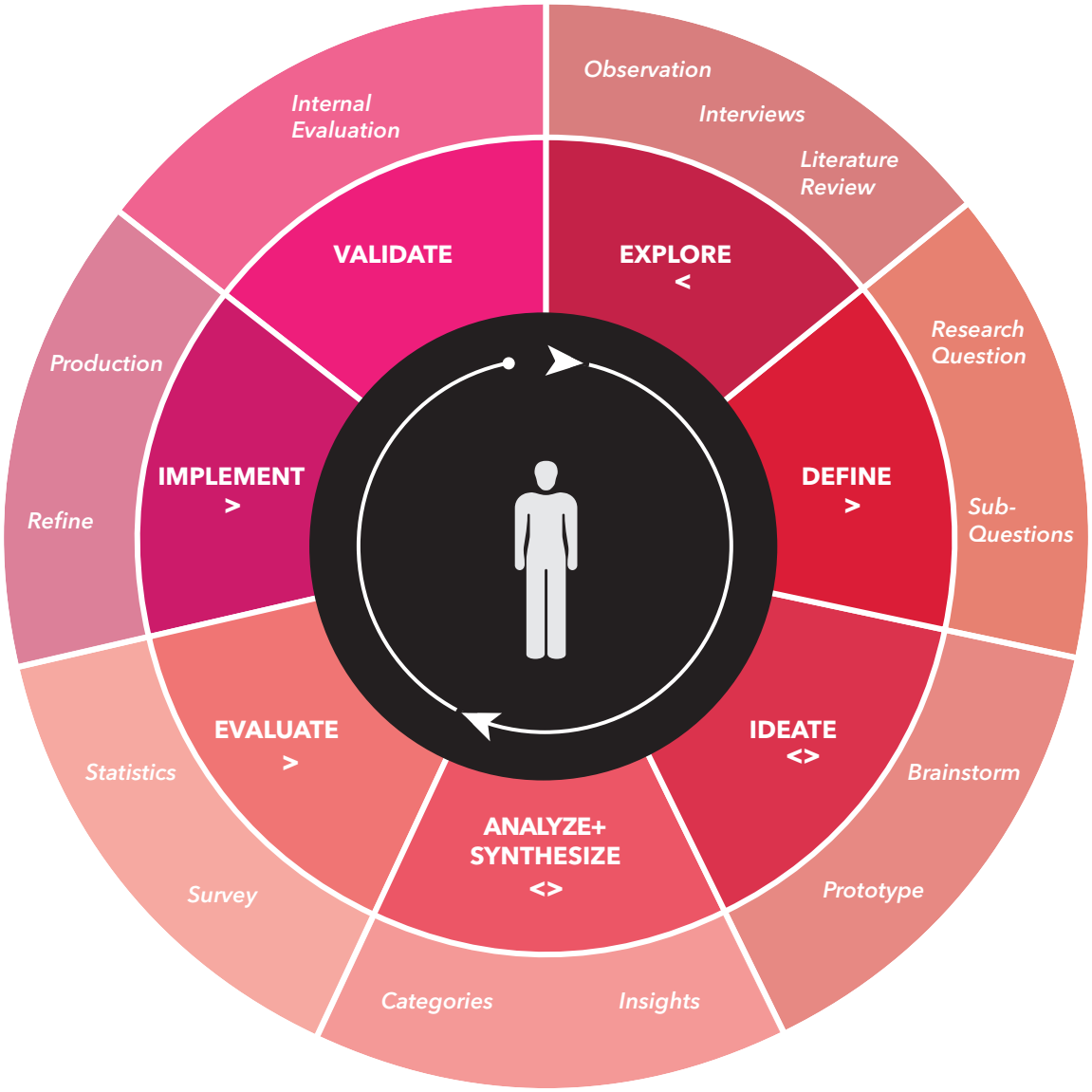
In order to address the identified "wicked problems" at hackathons of collaboration and communication, a design research methodology needed to be created that would best suit the objective of this research. Using Dr. Min Basadur's "Simplex Process" (1994) as a methodological framework for influencing team performance. The Simplex Process has eight distinct steps, for defining problems, discovering and implementing solutions that best address the identified challenge, with an ever-present understanding of alternative appropriate solutions.

Although Simplex is represented in a circular image with a seemingly distinct start and finish, the process tends to be non-linear and may vacillate between 2 or more steps before proceeding to next steps. At times, Simplex steps are completed "out of sequence", to suit the challenge, environment, and needs of stakeholders. "Wicked problems" require a methodology with the flexibility to account for an unconventional course of action; people centered design is an approach in problem solving that fits that profile.

This research concentrates on the "wicked problem" of identifying an appropriate process and subsequent tool that suits the needs of individuals, with varying cultures, education, and personalities, etc., attending hackathons. Initially, the research begins with a perceived problem, but as the methodological approach is executed, the research intent and outcomes will become clear.

A novel approach to solving the perceived problem was required for the purposes of this research. The design researcher developed a process model based on the Simplex model. The reason for using Simplex as a model for the proposed design research methodology is due to Simplex model's recognition in industry as an established problem-solving approach. After several iterations, the design research methodology generated to achieve this research's goals include seven steps with the intent to aid in developing a process and tool that can be used at hackathons: Explore, Define, Ideate, Analyze + Synthesize, Evaluate, Implement, and Validate.

Thesis Research Design Methodology



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Diverge: exploring numerous ideas without restriction

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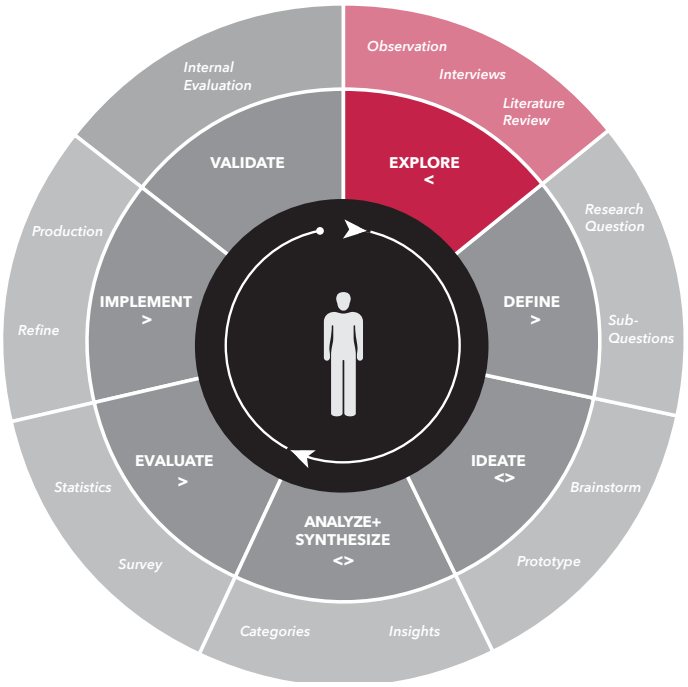
Converge: whittling down ideas to get to a single idea, or select few


Observation
Interviews
Literature Review
EXPLORE <
Research Question
Sub-Questions
DEFINE >
Brainstorm
Prototype
IDEATE <>
Insights
Categories
ANALYZE+ SYNTHESIZE <>
Survey
Statistics
EVALUATE >
Refine
Production
IMPLEMENT >
Internal Evaluation
VALIDATE

3.2 Preliminary Research

In order to validate the initial research question, various exploratory design research methods were conducted, as part of the Explore phase in the design research process. As previously stated, literature outlined two major challenge areas for team-building, collaboration and communication. It is understood that these issues affect teams in general, and interdisciplinary teams associated with technology are no exception. The first exploratory methods conducted were interviews, to gain insights from leaders in technology fields. One interview was with an IT manager based in healthcare and the second interview with a co-founder of an organization that routinely hosts hackathons. Each interview focused on roles and challenges on teams and potential improvements for collaboration and communication.

Exploratory Method: Interviews

General

Roles *What types of roles are on your teams?*

- Subject Matter Experts (SMEs)
- Change Management
- Stakeholders
- Sponsors
- Team Leader
- Front End Developers
- Back End Developers
- Designers
- Thinkers

Challenges *What are some challenges experienced?*

- Budget
- Schedule
- Scope
- Communication, within and between disciplines
- Not used to workingtogether
- Inefficiency
- Lack of structure
- Leaving team to do own thing

Key Research Insights

Teams working in technology fields are interdisciplinary, not just technical roles, which can affect team dynamic.

Teams with experience appear to have "concrete" challenges (project-related), while newly formed teams appear to have "fluid" challenges (people-related).

Each interview provided general information and information about communication, as well as key research insights. The results of the interviews can be seen below and on the next page.

Key Research Insights

Even when teams are in close proximity to each other, digital commucation seems to be the preference for sharing ideas

Digital platforms can be used to help increase communication, collect information, and plan for next steps.

Communication

Current *What are some forms of communication?*

Microsoft Sharepoint	Slack
Direct email	Teamwork app
Team meetings	GroupMe app
	Email

Improve *How could communication be improved?*

"I don't understand your language"	Communication, within and between disciplines
More participation from team members	Not used to workingtogether
	Inefficiency
SMEs communicate and discuss their roles, without being so technical in terminology	Lack of structure
	Leaving team to do own thing

- IT Project Manager
- Co-founder, Hackathon Event Organizer

Observation was the second exploratory method conducted at an Indianapolis hackathon, which resulted in gaining an understanding of the activities and interactions that occur at a hackathon. The event, named Indy Corporate (Corp) Hack, was held at the co-working space, Launch Fishers. Many teams were eager to get things started and, with prior access to data sets and had already begun working on what their solutions might look like before the actual start of the hackathon.

During registration, there were a few individuals who were still looking for a team and joined with others who were interested in working on the same challenge. Overall, participation at the hackathon was low, so if teams were not accepting additional team members, the choice was limited for un-teamed participants to join a team of their choice. When there was down time during the observation, informal interviews were conducted to build camaraderie with participants and receive in the moment feedback about their experiences.

Some of the feedback that hackathon participants shared from the informal interviews include:

1. Identifying a leader for the team is important; someone who is knowledgeable about what can and cannot be executed.

2. Having a process or ritual helps with work flow; some teams developed a process specifically for hackathons.

3. Making sure to meet the points of the customer; misinterpreting what is needed can lead to lost time.

4. Due to time constraints, team members can be lethargic, become grumpy and cause friction between other team members. It is important to keep relationships beyond the hackathon in mind.

5. Technical lingo is a challenge; may need an intermediary to translate between disciplines on the team. Defining terms within the team and from the client are important.

In addition to the feedback gathered from the hackathon participants, the design researcher's observations let to three insights, as seen on the next page.

design researcher insights

There were NO women who participated on teams during this event.
There were several women who were working behind the scenes as representatives of organizations (Touchpoint, KSM Consulting, and Indy Chamber of Commerce).

insight #1

[Why don't women participate in hackathons?]

There were a few teams that were still accepting people when the event started. Some teams were already formed and had their challenge picked out they would be working on for the day.

insight #2

[How do teams build comradery with each other?]

There were only 45 participants overall participating in the hackathon, a fairly low number, especially compared to the previous hackathon event sponsored by Techpoint, which had 150+ participants. Surprising, since prizes for the winners in each challenge were minimum $1500 per team.

insight #3

[What is the motivating factor for participating in hackathons?]

Due to an increase of hackathons in recent years, a question that is becoming increasingly relevant is how do team members get to know each other, if they don't already? Based on preliminary research it was identified that hackathon participants consist of two distinct groups: newbies and veterans. The newbie can be someone who is new both to the hackathon experience itself, as well as new to the team with whom they will be working. Veterans, on the other hand, have participated on teams together at hackathons, or may be a group of individuals who always work together at hackathons. The latter group typically has their own process, or model, for how they address hackathon challenges and their mode of work. Additionally, it was confirmed that major challenges that newbies encounter in trying to form and build camaraderie within their teams is collaboration and communication. These insights led to a reframing of the research question to address the needs of the hackathon newcomer, The Newbie.

LIGHT BULB MOMENT:

Focus on relationships between hackathon participants for research question.

Research Question Redefined

Based on insights gained from preliminary research, the research question went through a refinement process to best suit the challenges that hackathon participants, particularly newbies, face. Through an iterative process, each research question was a developed and evaluated to ensure it met the goals of the research, namely focusing on collaboration and communication for hackathon participants. Throughout the refining process, from the initial research question to the final version, each brought a clearer alignment and vision to what the process and tool could be to address the complexities of the "wicked problem" identified at hackathons, building relationships between newbie team members.

INITIAL RESEARCH QUESTION

How might people participating in hackathons make use of service design methods to create solutions for successful team-building at hackathons, encouraging communication and fostering collaboration?

"How might people participating in hackathons integrate service design methods to cultivate communication and foster collaboration for a successful implementation phase?"

Second Revision
The motivation of the second question revision was to achieve better communication and collaboration between team members, specifically in the implementation phase, through the use of service design methods in their design process. After evaluating this research question, the intent was to focus the research as a way to encourage team-building.

"How might people-centered design enable stakeholders to create tools that will promote a team-building environment for hackathon participants?"

Third Revision
The third revision question sought to focus mainly on the methods and tools available through service design, but did not ideally meet the objective of the research. After some reflection, the question was changed to reflect the thesis design research methodology identified earlier, as well as shift from finding a "solution" towards encouraging a behavior through tools in a particular context–hackathons.

"How might service design methods and tools play a part in creating team-building strategies for participants at hackathons?"

Fourth Revision
Further review of the revised question provided better clarity for who are hackathon stakeholders: organizers, participants, and sponsors. Additionally, consideration was given to the idea of the absence of an environment conducive to team-building at current hackathons.

The final research question revision drew together every consideration identified throughout the journey and focused on three things: the methodological approach, stakeholders and outcome.

FINAL RESEARCH QUESTION

How might people-centered design enable participants with varying hackathon experiences create a process or tool for building relationships within hackathon teams?

To supplement the research question, three research sub-questions were created to assist in developing outcomes for this research. Based on preliminary research and the evolution of the research question, the emphases of the research sub-questions are a reflexive space to share experiences, the development of processes and tools, and improving the quality of a team's performance.

RESEARCH SUB-QUESTIONS

1. How might people-centered design be used to create a reflexive space for hackathon organizers and participants to share their experiences?

2. How might hackathon organizers and participants create processes and tools for team-building?

3. How might hackathon participants use the processes and tools to improve the quality of team performance?

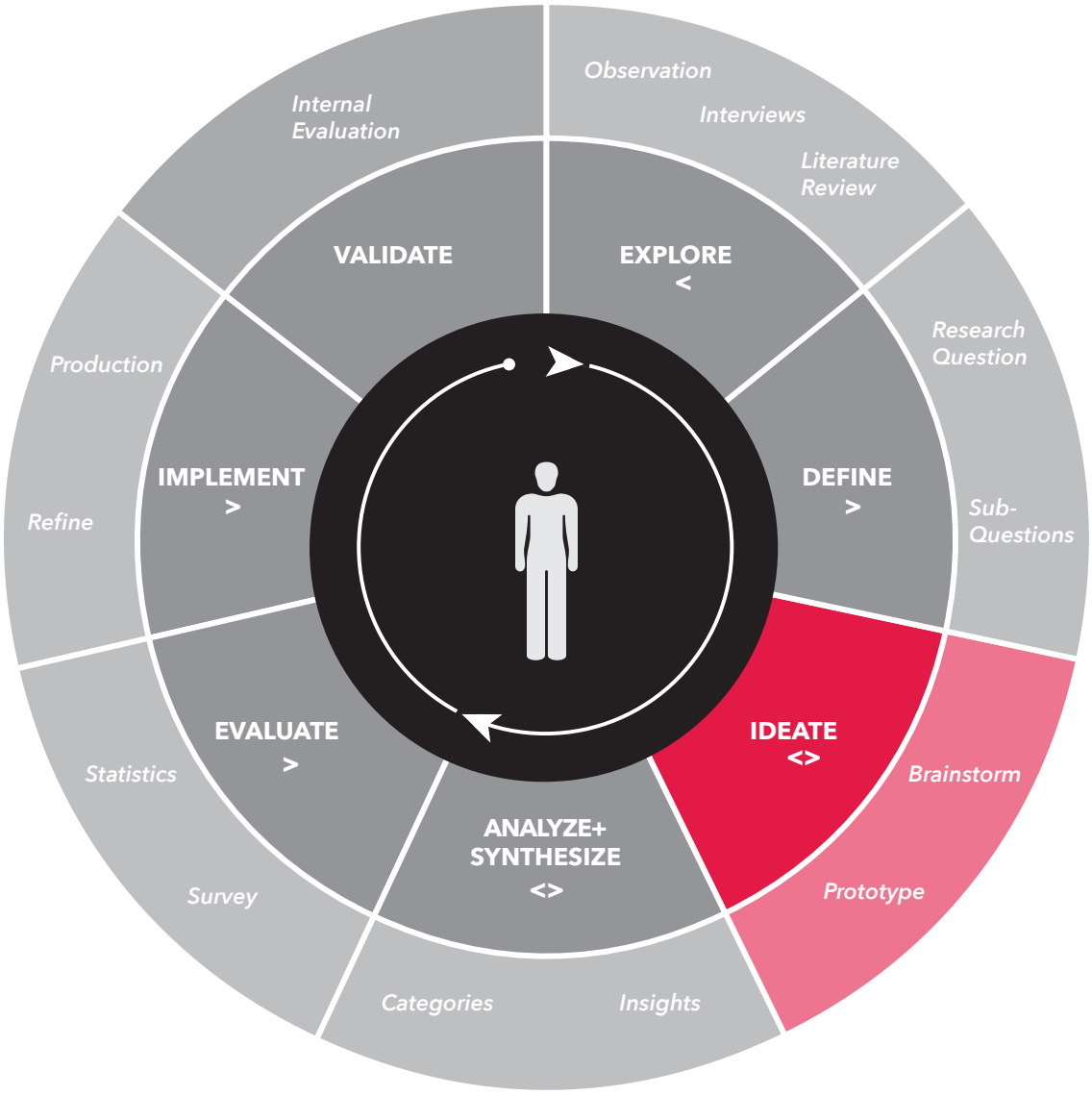
3.3 Limitations

The focus of this research is to use a people-centered design methodology to identify and provide a solution to communication and collaboration issues with building relationships at hackathons: how do teams with people unfamiliar with each other build the necessary camaraderie to perform as a unit (team-building)?

Limitations identified in this research include accessibility to research participants and timing of hackathon events. Identifying research participants can be a challenge in any research and with hackathons being such a novel event experience, the difficulty is high to identify research participants with varying hackathon experiences that are willing to volunteer for this research. The type of team-building identified within this research is exclusive to hackathon teams. The boundary of team-building is confined to newcomers, or newbies, to the hackathon experience. Well-formed hackathon teams may also benefit from the process and tool created from this research, but that is not within the scope of this research.

The region where the research was conducted has various hackathon events conducted, but the challenge was identifying a time frame to engage hackathon participants in the Evaluation stage. With a limited amount of time due to hackathon frequency, engaging participants proved to be a challenge. A benefit of using a people-centered design approach is the flexibility the methodology allows, particularly in the execution of research phases, as well as the selection and use of design research methods.

Although the research context is building relationships through team-building, there may be other issues within hackathon teams that are more prevalent than this project emphasizes. As insights arise, the ability to revisit defining the problem and exploring other hackathon team issues may not be possible to explore due to the timeline of the graduate program this thesis is a partial fulfillment. Potentially, each limitation can be explored and addressed in future research.


Observation
Interviews
Literature Review
EXPLORE
<
Research Question
Sub-Questions
DEFINE
>
IDEATE
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Brainstorm
Prototype
ANALYZE+ SYNTHESIZE
<>
Categories
Insights
EVALUATE
>
Statistics
Survey
IMPLEMENT
>
Refine
Production
VALIDATE
Internal Evaluation

3.4 Research

Two research sessions were conducted in order for participants to provide their insights about hackathons. In total, there were six participants: four at the first session and two at the second. The participants had varying hackathon experiences, from newbie to veteran to organizer. The reason for having participants who had either previously attended a hackathon or organized a hackathon, was to provide perspective and allow them to share their experiences as once being newbies themselves. Every participant was familiar with team-building in general, even if the newbies didn't have experience from a hackathon perspective.

Various methods were employed during the sessions to achieve the goals of gathering insights about challenges that newbies could face at hackathons and to create conceptual prototypes that could be developed further. The aim of the conceptual prototypes was to assist in shaping a newbie's hackathon experience, with the focus of the prototypes being to aid in team-building. Through the prototypes, a process could be defined that would also assist team-building at hackathons.

Methods

The design research methods utilized in the ideation sessions were selected to build a sense of unity and camaraderie between research participants. Participants were intentionally paired with someone whom they had no prior connection, as a way to simulate the experience at a hackathon. Thus, the participants would be able to generate ideas that might help them in collaborating as a team. Each method had a specific goal in order to further the research and answer the research question.

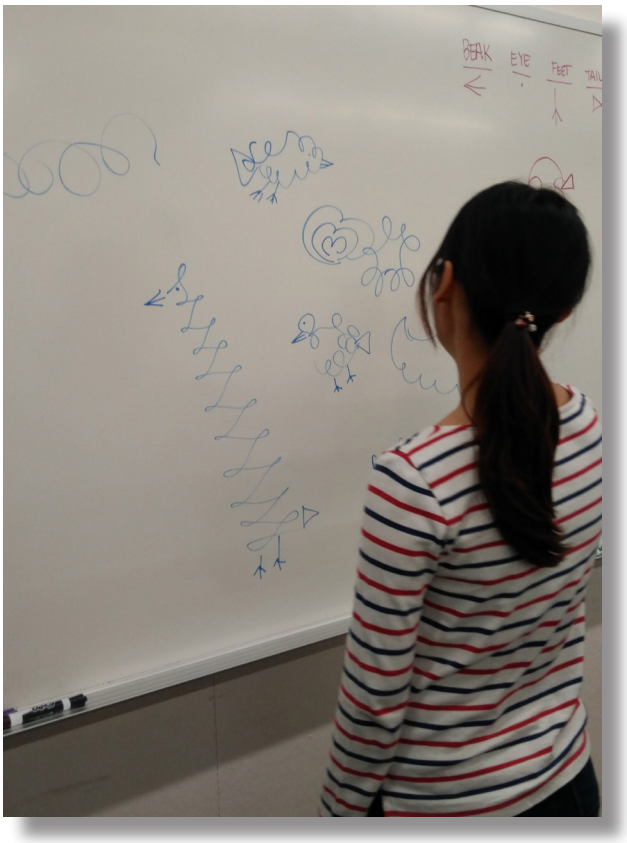
Warm up – Squiggle Birds

To open each session, I used a technique shared on Dave Gray's website, Gamestorming, which is a toolkit of games and ice breakers "for innovators, rule-breakers, and changemakers". Dave Gray is well-noted "leader and manager with a background in design". His "Squiggle Birds" activity is intended to encourage people in their visual thinking skills. I thought that this would be a good exercise for the research participants to start off with so that everyone would think they were capable of sketching later in the session.

Method Description: "Squiggle birds is a quick exercise that you can use to get people stretching their visual thinking muscles. It takes about five minutes and quickly, clearly demonstrates how little effort is really required to make meaningful, easy-to-read images. The main point of the demonstration is that our minds are already pattern-making machines, and very little drawing is actually required to convey an idea. The mind will fill in the rest."

Goal: To create a fun, creative environment for research participants and boost their confidence in their drawing abilities and ideation.

Each participant was instructed to make squiggles on a white board as seen in the picture. After a few minutes, the participants then made their squiggles into birds. They did this by drawing a triangle and line for the beak, a triangle for the tail, and lines to draw the legs and feet. The warm up was a quick and fun way to get engaged for the session.



Brainstorming #1

After the warm-up activity, the research participants were instructed to use sticky notes and marker pens. The first brainstorming activity was to think up as many barriers for building relationships on a team where people may not know each other beforehand. Depending on the hackathon experience of participants in the group, the instructions were to come up with barriers they felt were present in any team, not necessarily in a hackathon team, but would be transferable to a hackathon event.

Method Description: Basadur generally describes brainstorming as a technique for generating ideas. A more in depth definition of brainstorming is "[coming] up with ideas for meeting your targeted problem definition challenge" by following simple rules, such as no criticizing of ideas and producing as many ideas as possible (not worrying about the quality).

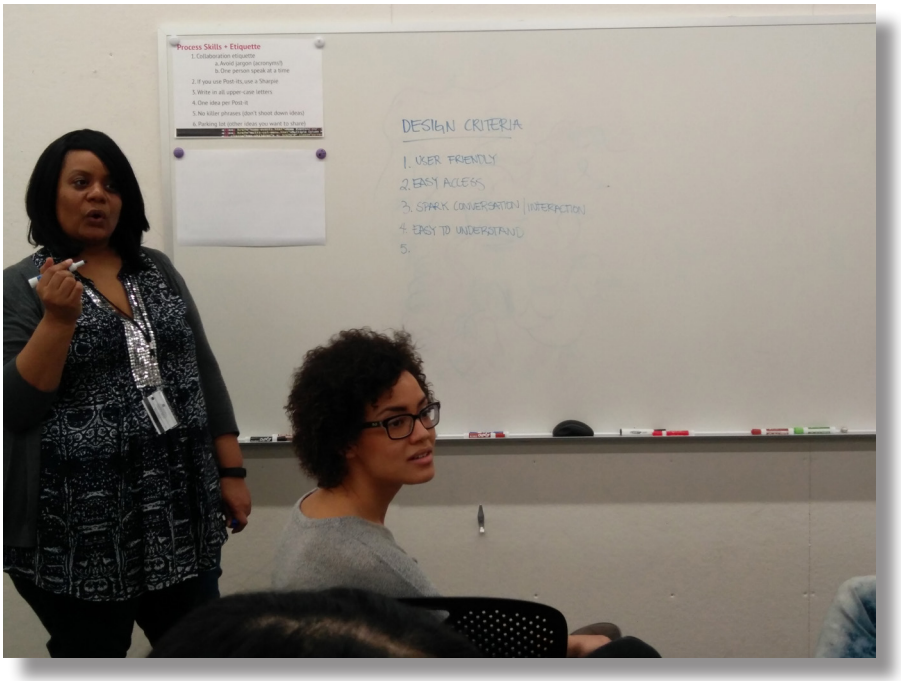
Goal: Formulate ideas that can be used in Forced Connections to create opportunities addressing issues of barriers.

Brainstorming #2

The aim of this brainstorming activity was for research session participants to produce design criteria that would embody the characteristics necessary for their "widget" to create connections between hackathon team members. A widget was defined as a solution or opportunity, much like a game, an activity, or an app, that would assist hackathon team members with getting to know each other better. The intent for defining design criteria was so that the characteristics that were deemed most important were reflected in the prototype that the participants would create later in the research session.

Method Description: Same as previous brainstorming description

Goal: Formulate design criteria that can be used in creating opportunities that will meet the needs of future hackathon participants.



Forced Connections

During the Forced Connections activity, the research participants were broken up into pairs. The purpose of this activity was to instruct teams to use worksheets to imagine two different "widgets" that could be made to address a certain barrier, while combining two design criteria. Participants were given the option of addressing the same team barrier, while using a total of four different design criteria, or select two team barriers and use the various design criteria to solve both barriers. With the latter option, participants were able to use 2-4 design criteria, whichever they that would be best to reduce the team barrier effect.

Method Description: Basadur asserts that the activity of forcing connections is to "force a fit between seemingly unrelated ideas or objects". This method was adapted a bit, using the ideas generated from team barrier brainstorming and the brainstorming for design criteria, and ideating on ways a "widget" get address the barrier through innovation with the two design criteria.

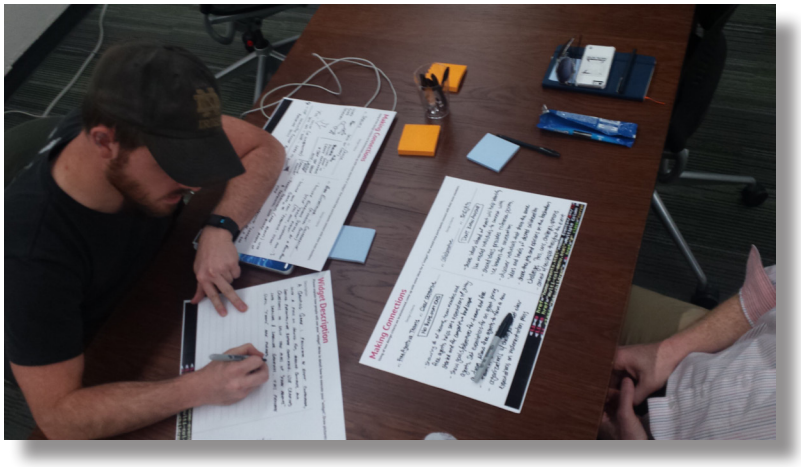
Goal: Enable participants to ideate on potential opportunities for reducing barriers that affect hackathon participants from connecting with their team members.

Build Your Prototype

As with the Forced Connections method, the Build Your Prototype method was performed in teams of two. Research participants used worksheets to draw a representation of their idea, including a detailed description on how their idea would work. Participants were encouraged to sketch as much as possible; this would be helpful in designing the resulting process or tool that would transpire from this research.

Method Description: In Universal Methods of Design, prototyping is defined as "the tangible creation of artifacts at various levels of resolution, for development and testing of ideas with design teams and with clients and users. Typically, there are two types of prototypes: low-fidelity and high-fidelity. Low-fidelity prototypes tend to be a simpler design, such as a sketch, or the use of paper to create a 2-D representation of the prototype. High-fidelity prototypes, as one would imagine, are typically a more refined representation of an object. This prototype may use more advanced materials, such as clay, foam, etc., and may even have some basic functionality, such as a mockup website that is clickable.

Goal: Create several ideas for relationship-building at hackathons that can be evaluated by research session participants and additional people who have participated or will participate in hackathons.

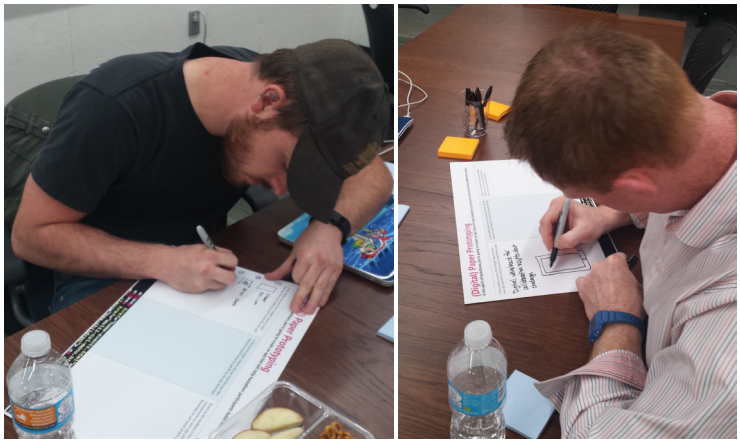


Round Robin

Due to reduced availability of some participants, session #1 was unable to conduct this method. The purpose of doing Round Robin was to create digital-only prototypes. In the second session, research participants were instructed to create a digital idea for relationship-building. Next, participants switched their sheets with each other and then shared why that idea would fail. Lastly, the original creator made improvements based on the feedback received about their design.

Method Description: The Luma Institute (2012) defines Round Robin as an activity in which ideas evolve as they are passed from person to person. In more detail, one person creates an idea, usually on a sheet of paper, and then that sheet of paper is passed on to another person, who shares a reason that idea may fail. At this point, the sheet can go back to the originator or to another person, who then will resolve the critique.

Goal: Create digital technologies for the hackathon, that might appeal more to hackathon participants who are familiar with technology.



Outcomes

Based on the previously mentioned methods, a lot of information was gathered from the research participants. First, participants were able to brainstorm reasons for team barriers and then brainstormed on design criteria that would be important in designing a tool to assist newbies in the hackathon experience. Lastly, both session's participants were asked to identify criteria that would be necessary to evaluate the conceptual prototype designs created.

The top 5 overall barriers to team-building that the research participants identified were: language (or not speaking the same language as other participants), lack of hackathon experience, (lack of) confidence, shy, and cultural / nationality differences or perceptions. These five barriers were mentioned by both groups of participants and therefore seemed to be the most important in why newbies would have difficulties in building teams with other participants or becoming a team member on an already formed team.

BARRIERS

Session 1

Language / do not speak same language*
Lack of experience*
Lack of confidence*
Shy*
Cultural*
Don't know what shared interests are
It is hard finding commonalities
Only know about social status, but not knowing the person
Perceived differences
Communication preferences
Negative past experience
Bad day
Personality
Some people are rude
Bad manners
Extrovert v. Introvert
Different senses of humor
Afraid of judgment
Afraid of saying something wrong
Fear

Session 2

Language*
First time attending*
Confidence / Dedication*
Shy*
Nationality / ethnic perceptions*
Motive (of others)
No expectations / goals
Access to equipment (strategic impact)
Perceived lack of skills
Language (coding)
Perceived skill set (of others)
Need for facilitation
Don't know anyone
Gender
Economic class perception
Waiting for invite
Not sure how to start conversation
Lack of historical interaction; "gut check"

*Similar insights on barriers during both sessions

After brainstorming barriers to team-building, the research participants were asked to brainstorm design criteria that would be appropriate for designing a tool to assist in team-building at hackathons. The first research session participants came up with 11 criteria and the second research session participants agreed to the 11 criteria with no further additions.

Design Criteria

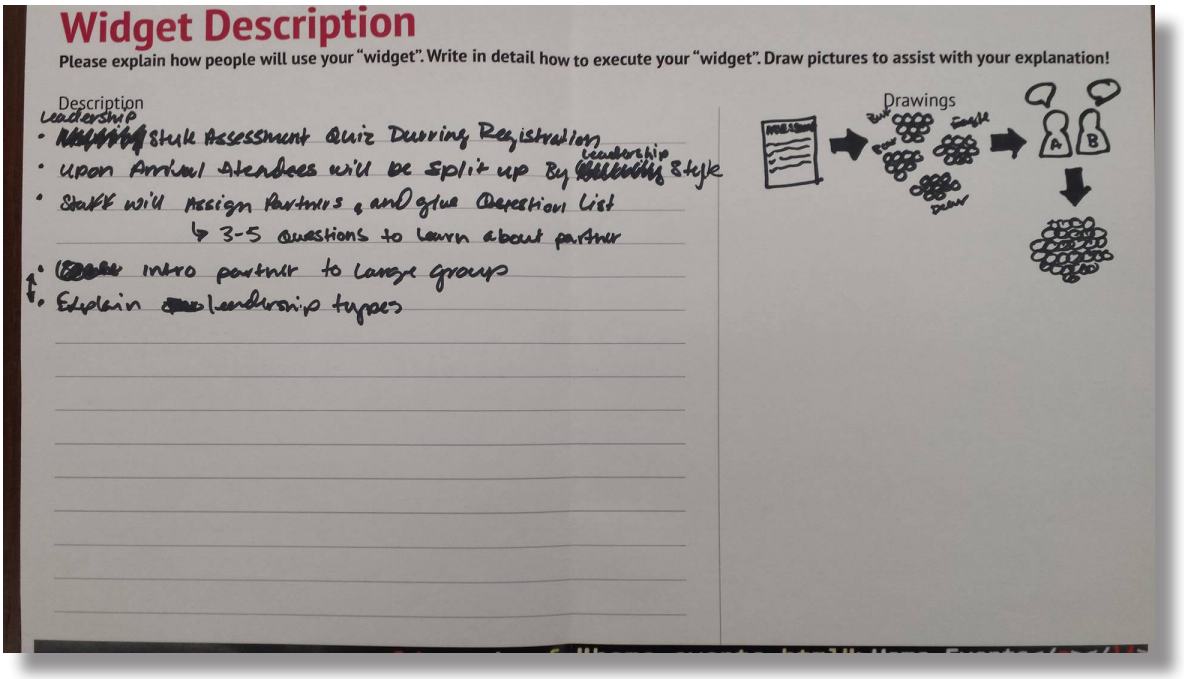
1. User-friendly
2. Easy access
3. Sparks conversation / interaction
4. Easy to understand
5. Equitable / Non-competitive (score or outcome doesn't matter or count)
6. Engage with team / collaborative
7. Provides guidance / etiquette
8. Confidence building
9. Personalized / customized
10. Appropriate / meets goals (builds relationships)
11. Out of context of hackathon (e.g. sports-related, use of Play-doh, etc.)

Once the design criteria was established, the research participants were placed into pairs and created conceptual, low-fidelity prototypes for tools that could assist newbies at hackathons.

Lo-Fi Prototype Ideas / Descriptions

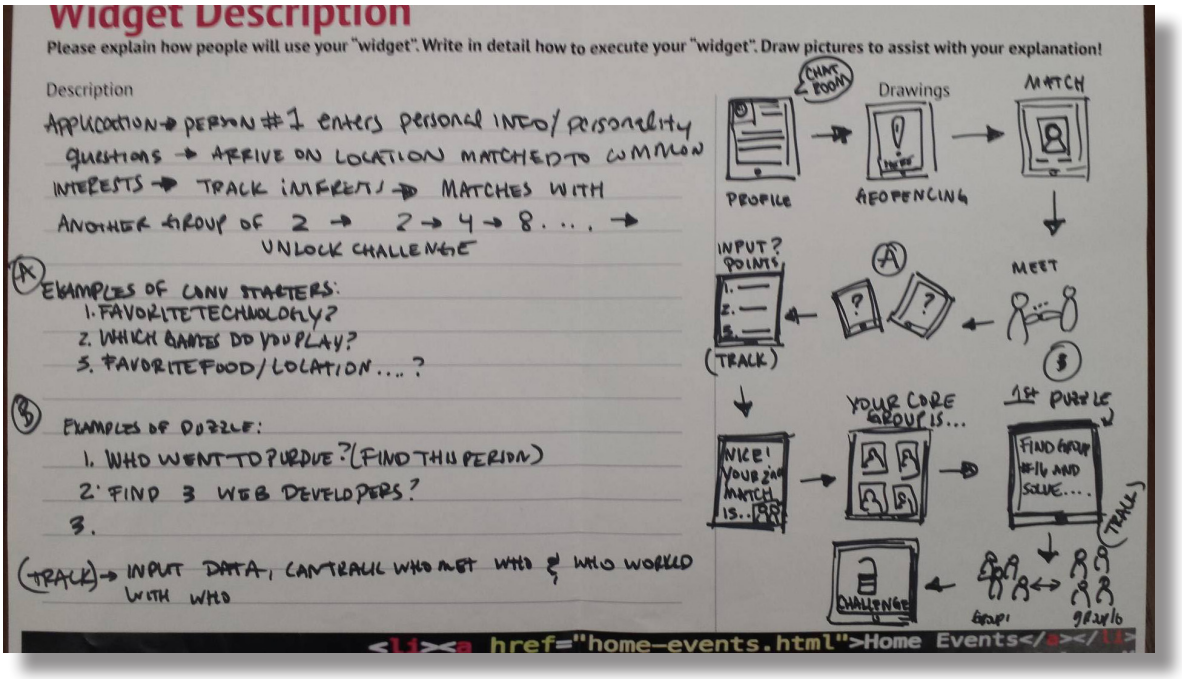
Prototype #1
Name: Leadership Styles [Skills Assessment]
Type: Non-digital

A leadership style assessment quiz given during registration. Upon arrival, attendees are split up by leadership style. Hackathon event staff will assign partners and give each pair a question list, with 3-5 questions to learn about their partner. After the brief interviews, all registrants will convene into a large group and introduce their partner. Hackathon event staff will share what are the different leadership types.



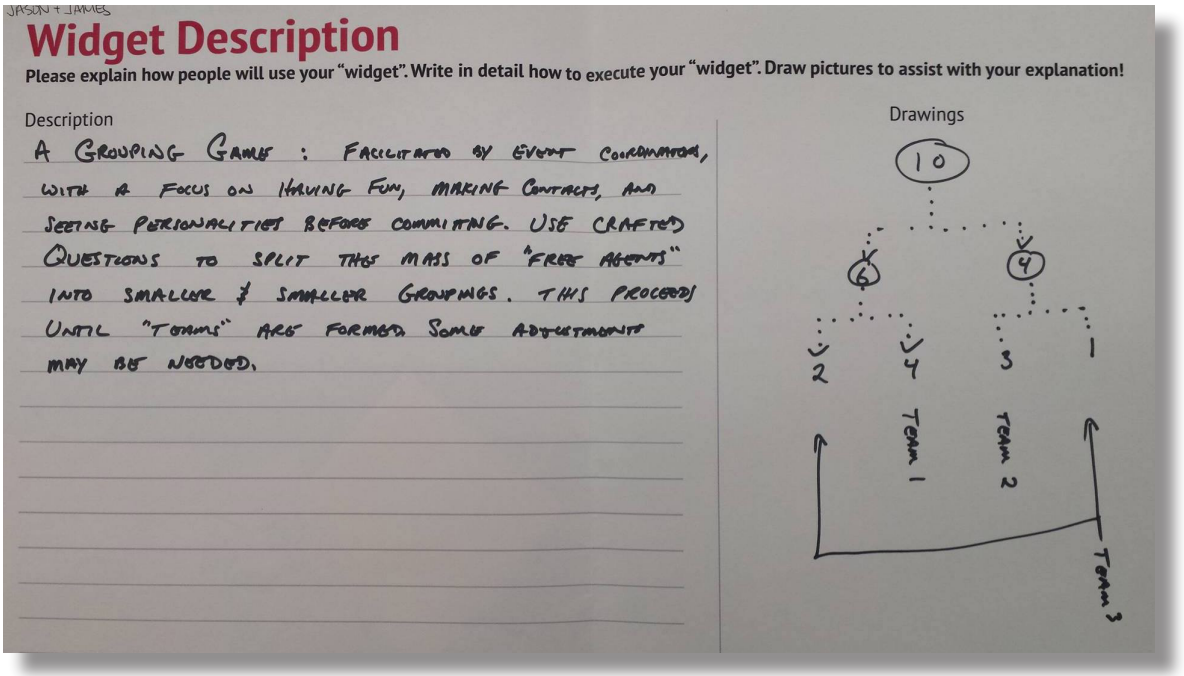
Prototype #2
Name: Conversation Starter [Mobile Application]
Type: Digital

Hackathon participants enter personal info and answer personality questions via website or application. When participants arrive on location to hackathon, they are matched to another participant that has common interests. After a pair of participants have answered questions and input responses into the app, they are potentially matched with others with common interests. Once a group is formed they then answer questions to solve a puzzle. When puzzle is solved, the group gets access to the hackathon challenges and data sets.



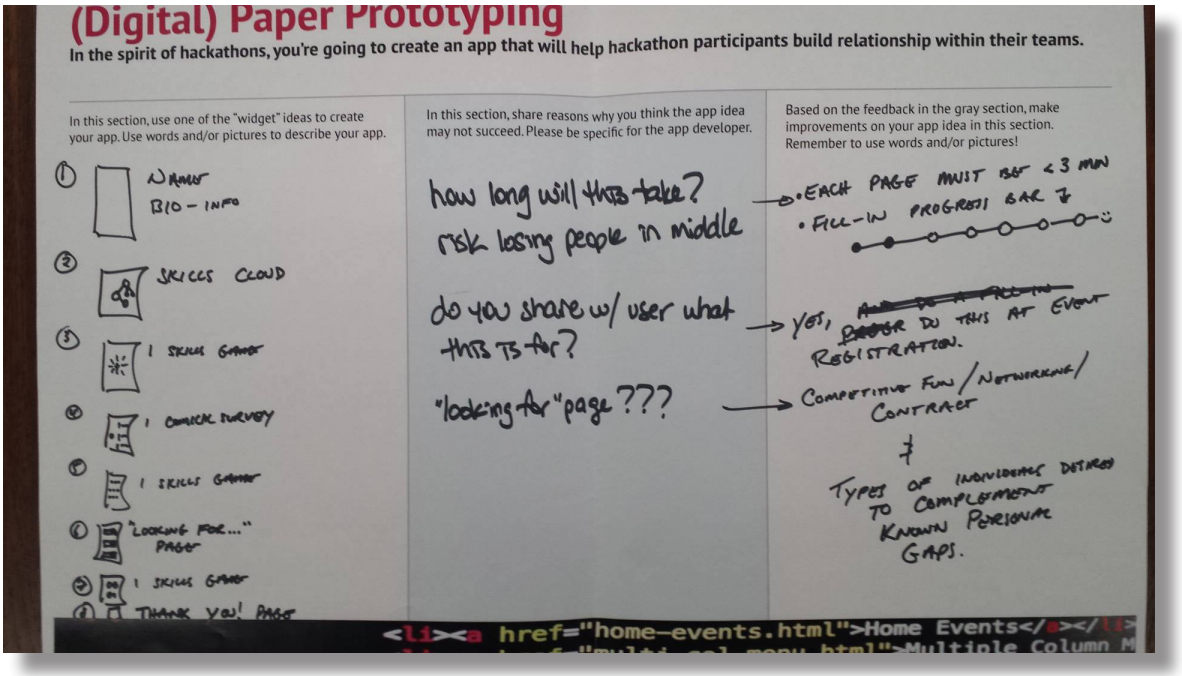
Prototype #3
Name: Free Agents [Game]
Type: Non-digital

Hackathon participants play a grouping game that is facilitated by hackathon event organizers. The focus of the game is to have fun, make contacts and see personalities prior to committing to a team with individuals. Questions are crafted prior to the event to split the mass of "free agents" into smaller groupings. The splitting of groups continues until "teams" are formed. Some team adjustments can be made as needed.



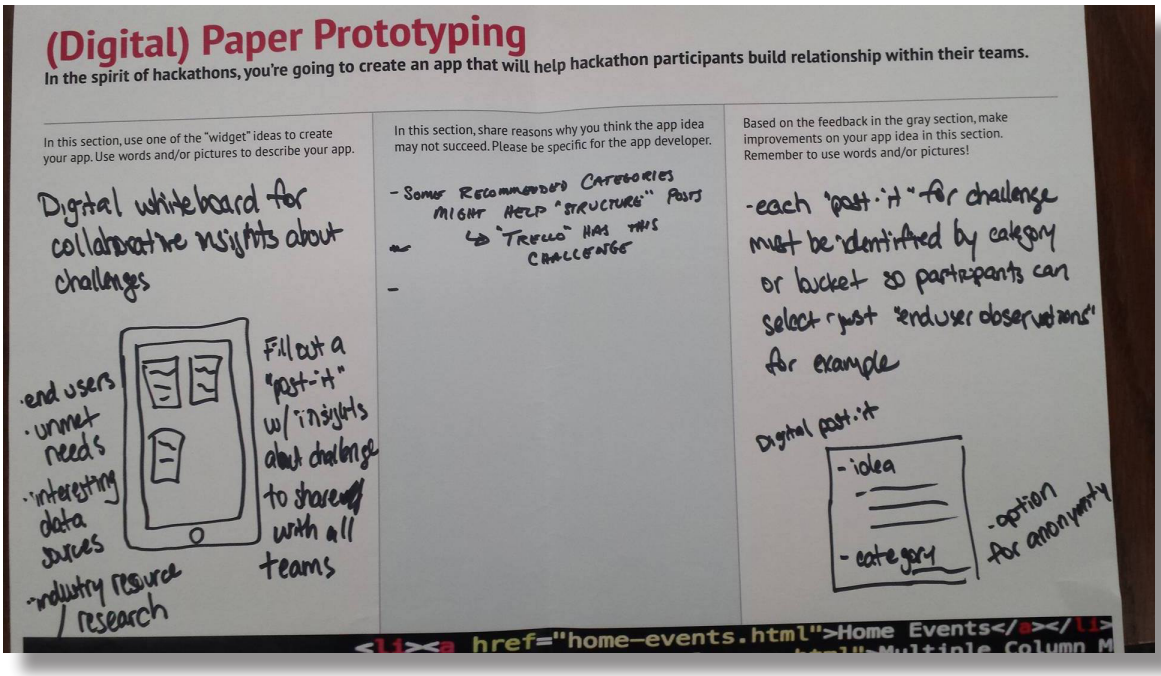
Prototype #4
Name: Gamified Skills [Skills Assessment]
Type: Digital

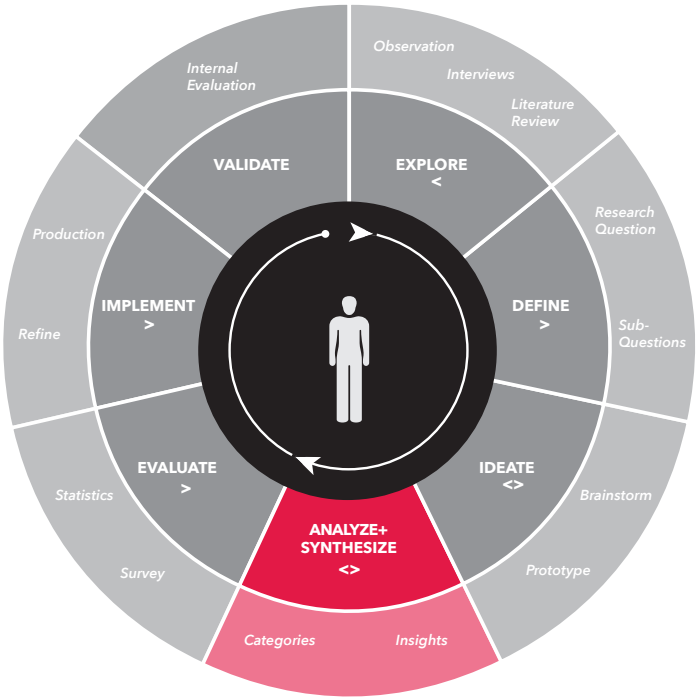
Hackathon participants sign up via website or mobile application during registration to play a series of skills games. Each game takes less than three minutes and a progress bar shows where the player is for the assessment. Participants can use this as a tool to network and determine what skills someone else has that might fill a gap on their team.



Prototype #5
Name: Collaborative Insights [Whiteboard]
Type: Digital

A digital whiteboard is set up on site of the hackathon. All teams share insights about the challenges that their team is aware. This is done by filling out a sticky note, which is then categorized, so that participants can select the main category to view the ideas. Individuals or teams may submit information anonymously, if they wish.





Analysis + Synthesis methods

In order to analyze and synthesize the data collected from the participations, two methods (affinity clustering and schematic diagramming) allowed the design research to further understand the major categories that can affect the team-building experience and create a paper version of what the final outcome might look like.

Affinity Clustering

Goal: Identify what are the major barrier categories for team-building, to later use that information to craft the process or tool to address some (or all) of those barriers.

Method Description: Luma Institute calls a graphic technique for sorting items according to similarity Affinity Clustering (2012). When a topic is identified and people brainstorm ideas (usually on sticky notes) related to that topic, the notes are clustered based on how connected they are to one another. Once all the items are grouped in a cluster, each cluster is labeled an overarching theme that unifies the items.

Data from both sessions was used to conduct this method. First, each data set from each session was clustered and then all the data together was clustered. Many of the barriers listed were similar in both sessions. The major categories that emerged after clustering and categorization:

1. Personal Identifiers
2. Emotions
3. Experiences
4. Communication
5. Motivation
6. Personal Characteristics
7. Skill Set

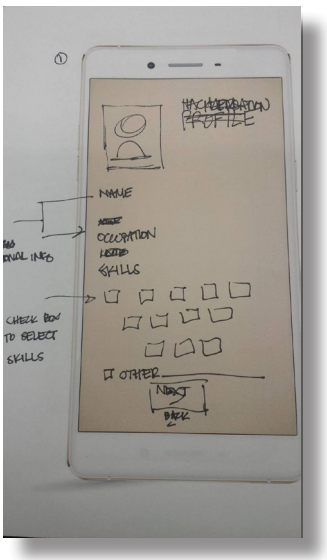
It would be important when designing the final tool to take into consideration these barriers and have features that address them in some way.

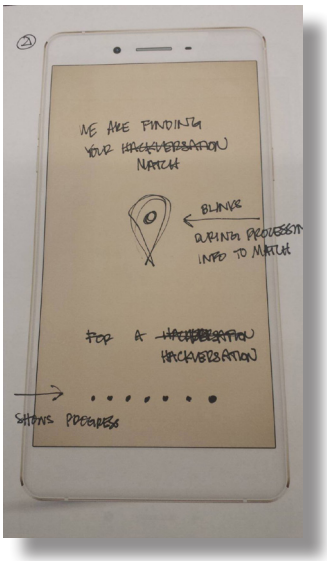
Schematic Diagramming (Wireframes)

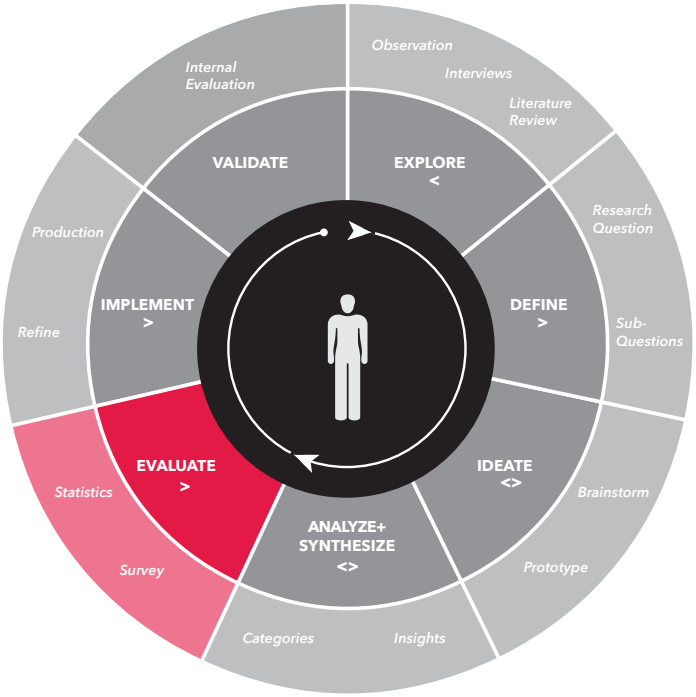
Goal: Use this technique to create sketches of what the final tool may look like to make a more refined, digital representation of the research outcome.

Method Description: Luma Institute (2012) describes Schematic Diagramming as an outline of the structure and essential components of a system. This method can be used to develop an idea or concept, by an individual or a group of collaborators. The goal is to create a skeletal version of the idea or concept, with basic elements and descriptive phrases.

Using a printed graphic of a popular smart phone, multiple screenshots of the mobile application were created. This enabled digital mockups of the application to further visualize how the tool would look. In addition to the concept provided in the paper prototype, the features designs highlighted how the application addresses some of the main barriers that affect team-building at hackathons.







Evaluate

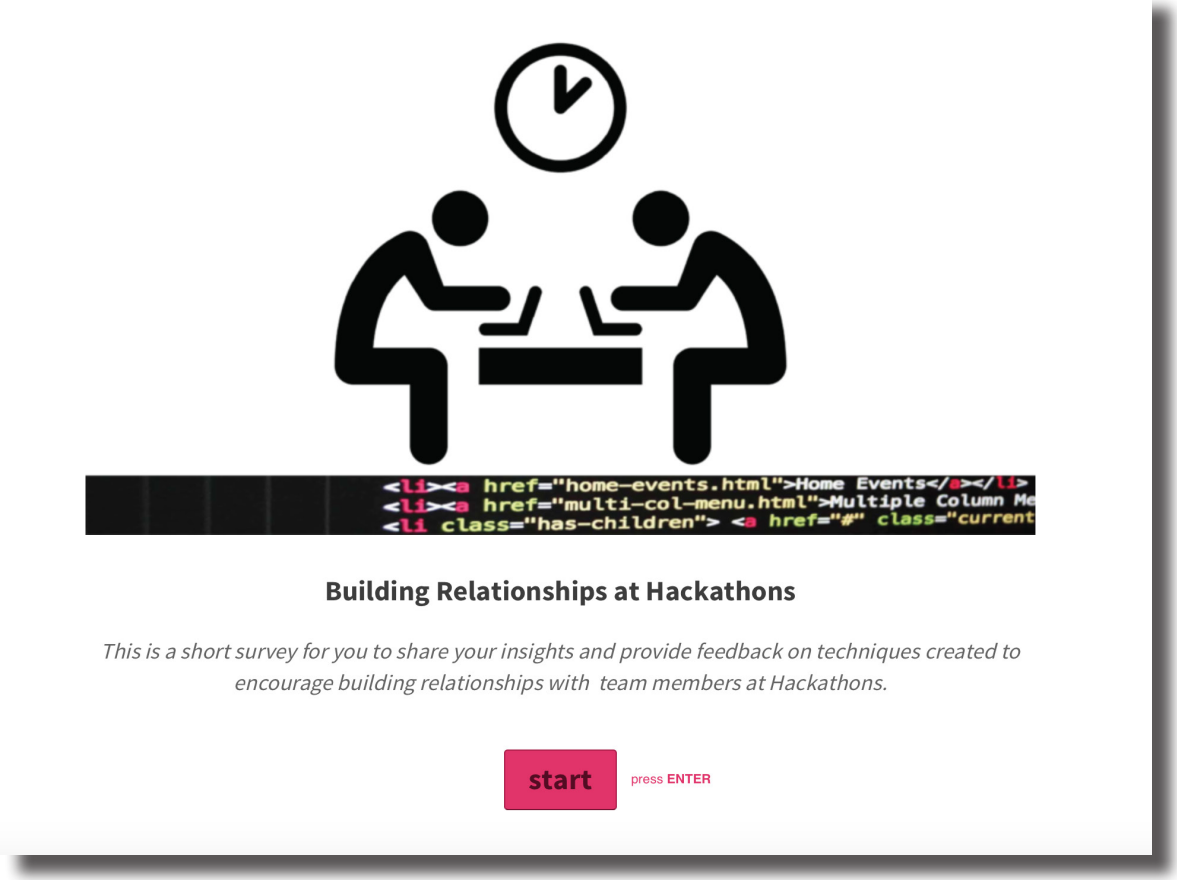
Two methods were utilized to allow participants to provide evaluative feedback on the prototypes created during the participation sessions. An online survey was created to capture participant feedback and the design research used participant feedback to fill out a criteria matrix to evaluate the prototypes.

Survey

Goal: Evaluate all of the designs created in the research sessions. Determine which design would be best to create a more refined design.

Method Description: In Universal Methods of Design (2012) surveys as defined as "a method of collecting self-reported information from people about their characteristics, thoughts, feelings, perceptions, behaviors, or attitudes". Surveys can be in paper or electronic form and are often used to collect date from a large number of respondents.

To include all participants in the evaluation process of the prototypes developed in research sessions, a digital survey was created to collect participant's insights based on the evaluation criteria they identified. Participants were questioned on their thoughts of what improvements could be made to the prototypes and what they believed made for a quality team performance.



Landing page for the online survey

Criteria to evaluate

1. Scalable
2. Reusable
3. Low cost
4. Easy to implement
5. Not time consuming (@ hackathon)
6. Appropriate

The six participants who responded to the survey were able to give their feedback on how the prototypes could be improved and what would assist with the quality of team performance. The table on the next page captures each participants thoughts.

1	I really like the ideas that manage to escape the "build an app for this" mentality. Despite it being a hackathon (where tech-averse people generally...~aren't~), changing the pace is good for helping everyone get out of comfort zones and into a cooperative mindset.	Team Cohesion - the feeling of a strong team bond seems to be very important to the effective use of time and skills.
2	Helping participants to communicate their own skill sets; furthermore, facilitating the matching process with someone who has different skill sets.	Having appropriate way to communicate with each teammate and having similar motivation.
3	Nope! These look fantastic!	Nope! These look fantastic!
4	A quick and easy way would be to identify people who do not have groups, randomize them together using numbers or a survey, and conduct a brief icebreaker. The people who come with a team can also participate in the small group ice breaker.	A diverse group of people with unique individual skill sets who can contribute their strengths appropriately in collaboration.
5	Several of the suggestions include some sort of icebreaker/game. I think it would be good to incorporate more facilitate networking into the weekend. Create an atmosphere of more fun and community, rather than heads down competition.	A commitment to the work for the entire Hackathon period, but also a genuine interest in having fun and helping the organizations offering the "hacks."
6	N/A	Cohesion between teammates.

 = Participant

 = Improvement

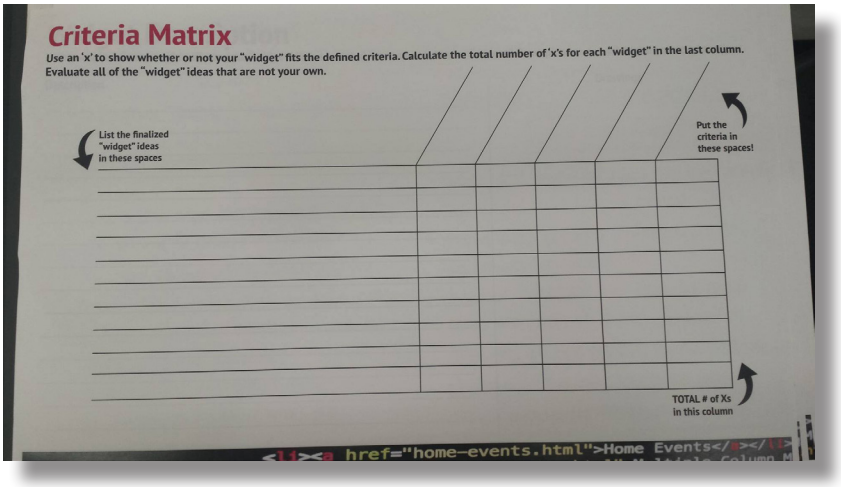
 = Team Performance Quality

Criteria Matrix

Goal: Rate the prototypes developed during the research sessions based on evaluation criteria that the participants come up with as most important for the process or tool to be selected.

Method Description: Basadur (1994) calls the criteria matrix by a different name, "criteria grid method", but they are essentially the same thing. This method allows for the selection of a best possible solution, rated by outline criteria against all proposed solutions. Place all the solutions vertically on the left along a grid and the criteria horizontally at the top of the grid. Determine a ranking scale that is appropriate for evaluating the solutions. An important thing to remember is to rate all solutions by a single criterion to eliminate the "halo error". "Halo error" occurs when a rating against one criterion biases your evaluation on subsequent criteria (Basadur 1994).

Based on the information gathered from the survey on the participant's thoughts on the prototypes, the design researcher was able to complete a criteria matrix using a binary system based on majority vote for a particular criterion. Binary was used instead of a traditional ranking due to ease for participants to rate and conservation of time.


Criteria Matrix
Use an 'x' to show whether or not your "widget" fits the defined criteria. Calculate the total number of 'x's for each "widget" in the last column.
Evaluate all of the "widget" ideas that are not your own.
List the finalized "widget" ideas in these spaces
Put the criteria in these spaces!
TOTAL # of Xs in this column
href="home-events.html">Home Events</</

Using the basis of majority votes from the surveys administered to research participants, the criteria matrix for prototypes meeting the established design criteria are the following:

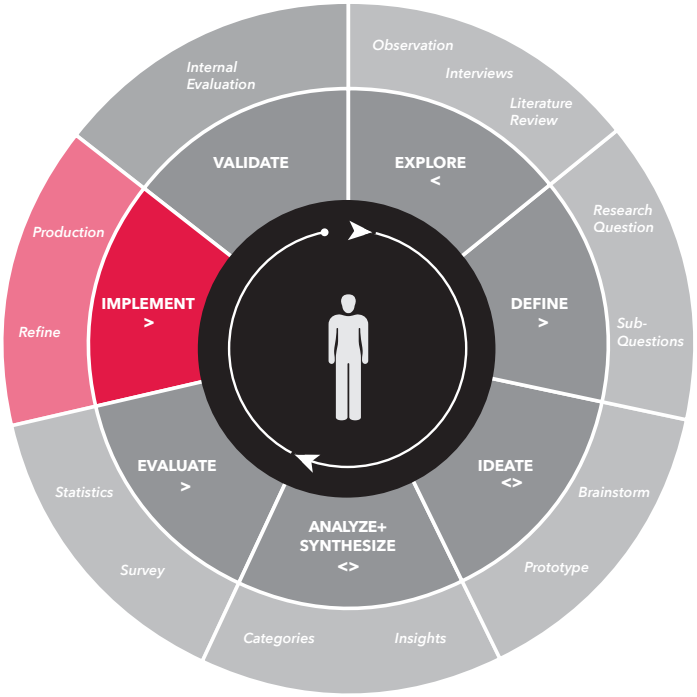
Prototype	Scalable	Reusable	Low Cost	Easy to Implement	Time Conscious	Appropriate	Total # Xs
Skills Gamification	X	X			X	X	4
Collaborative Insights	X	X		X	X	X	5
Conversation Starter	X	X			X	X	4
Leadership Styles		X	X	X			3
Free Agents		X	X	X		X	4

The conversation app was the only process or tool that all research participants felt was appropriate. Based on the intent of the research and foundation of people-centered design to create solutions that meet the needs of a stakeholder group, coupled with appropriate being a criterion for both design and evaluation, the appropriateness of the process or tool appeared to be most important. Due to all of those considerations, although the Collaborative Insights tool had the most votes across the board for evaluating criteria being bet, the most votes for appropriateness was the Conversation Starter. Thus, the tool selected to further develop will be the Conversation Starter mobile app.

4.0 DESIGN OUTCOMES

4.1 Process
4.2 Tool

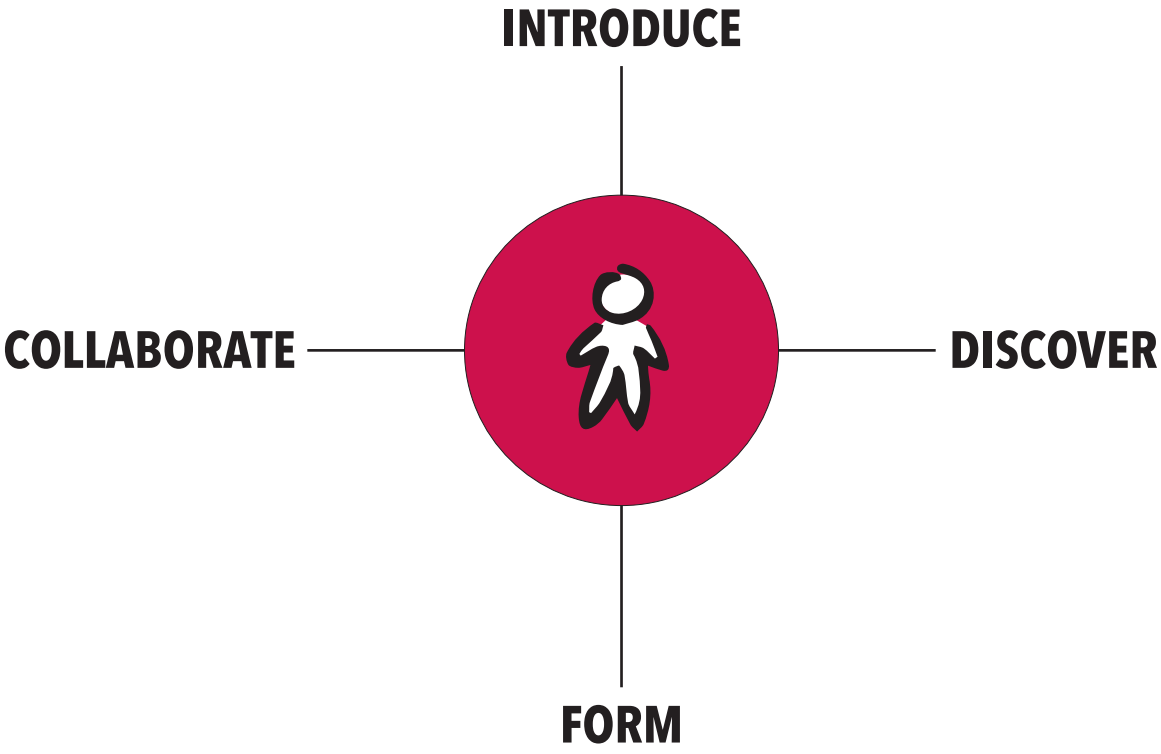
4.1 Process



The goal of this study is to co-create an outcome that can be used at numerous hackathon events and potentially in additional contexts that require interdisciplinary collaboration. Through analysis and synthesis, two results emerged as a result of this research: an effective team-building process for hackathons and a co-created tool in the form of a mobile application.

The Process: Introduce, Discover, Form and Collaborate

The proposed team-building process is broken down into four steps: Introduce, Discover, Form and Collaborate. This team-building process is designated as the IDFC process. The IDFC process seeks to address the barriers identified during research sessions, that prevent or discourage successful team-building. Although the IDFC process is created for the purpose of building relationships at hackathons, it can be revised to accommodate various other environments.


INTRODUCE
COLLABORATE
DISCOVER
FORM

Introduce: This step activates communication between two or more members of a proposed team. By introduction of self with the sharing of personal interests, other team members are able to find commonalities of themselves within their team members.

Discover: The Discover phase allows for more in-depth conversation to take place. During conversation, team members are able to learn about each other's skill sets and motivation for participating on the team, or achieving the team goal. Potential team members are encourage to share their experiences, particularly experiences they have at other hackathons. During this phase, team members may also have the chance to set an overall team goal.

Form: Based on information gained from the Introduce and Discover phases, team members can opt to form a team, or chose other individuals they feel may be more suitable based on personality traits or skill sets. If teams choose to select other individuals to build their team, it is suggested that they repeat the Introduce and Discover phases so that members are not left out of any of the process with their team mates.

Collaborate: Once team members have successfully gotten through the Form phase, they are able to address the hackathon challenge and determine a process that best suits their team to achieve their stated goal.

The IDFC process is integrated to be a part of the mobile app Hackversation, which encourages individuals to connect and communicate with each other at hackathons, based on their common interests.

4.2 The Tool: A Mobile Application

The research session participants provided a description of their prototype which then was activated to brainstorm a name for the conversation starting mobile application. Ultimately, the title for the app was designated as "Hackversation", a play on the words "hackathon" and "conversation". Each app screen details seek to fulfill some design criteria previously created by research participants, ensuring that the app is a reflection of the intent of the research, building relationships.

Design Criteria

1. **User-friendly**
2. **Easy access**
3. **Sparks conversation / interaction**
4. **Easy to understand**
5. **Equitable / Non-competitive**
6. **Engage with team / collaborative**
7. **Provides guidance / etiquette**
8. **Confidence building**
9. **Personalized / customized**
10. **Appropriate / meets goals**
11. **Context-flexible**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80%
HACKVERSATION
</>
</>
USER NAME
PASSWORD
Select Hackathon
#INDYCORPHACK
IoT & Civic Hackathon
#REFUGEEHACK

Key Features

Hackversation has several key features that were outlined by research participants and augmented further, as part of the co-design process. The top three design criteria that each feature meets are also highlighted to validate the appropriateness of the mobile application in meeting the needs of the intended population.

Geofencing

With cell phone GPS activated, once participants arrive to the location where the hackathon will be held, they will see where is their match and meet them at a designated spot.

Team Formation

When a pair of participants meet, the conversation is triggered by questions (ex: What video games do you play?) and they input info about their partner into the app. The app will match them with another pair after all info is captured. Based on key roles and skills needed for the hackathon, teams can be formed.

Puzzles

Once a group is formed, they are challenged to meet with another group and answer a set of questions based on the information provided on participant profiles.

Challenge / Data Set Unlock

When all the questions are answered from the puzzle, the app will unlock the hackathon challenge(s) and give the groups access to the data sets provided by the event sponsors.

Data Analytics

After data is input on a participant's profile, hackathon event organizers can see the characteristics and skills of participants, who met who, and who worked together on teams. Additionally, participants can also see information about other participants and who they may want to work with in the future.

Home
Design Criteria Met: User-friendly, easy access, personalized / customized
Four C: Context

The landing screen for Hackversation will allow participants to set up an account, log in and select the hackathon in which they are participating. A help link will also be available to answer FAQs.

Profile
Design Criteria Met: User-friendly, easy access, personalized / customized
Four C: Competencies

Each hackathon participant will have the opportunity to input personal information that will be used to match them with other participants and for hackathon organizers to see and perform data analytics.

Geofencing
Design Criteria Met: Provides guidance / etiquette, confidence building, Context-flexible

Team Formation
Design Criteria Met: Sparks conversation / interaction, provides guidance, confidence building
Four C: Composition

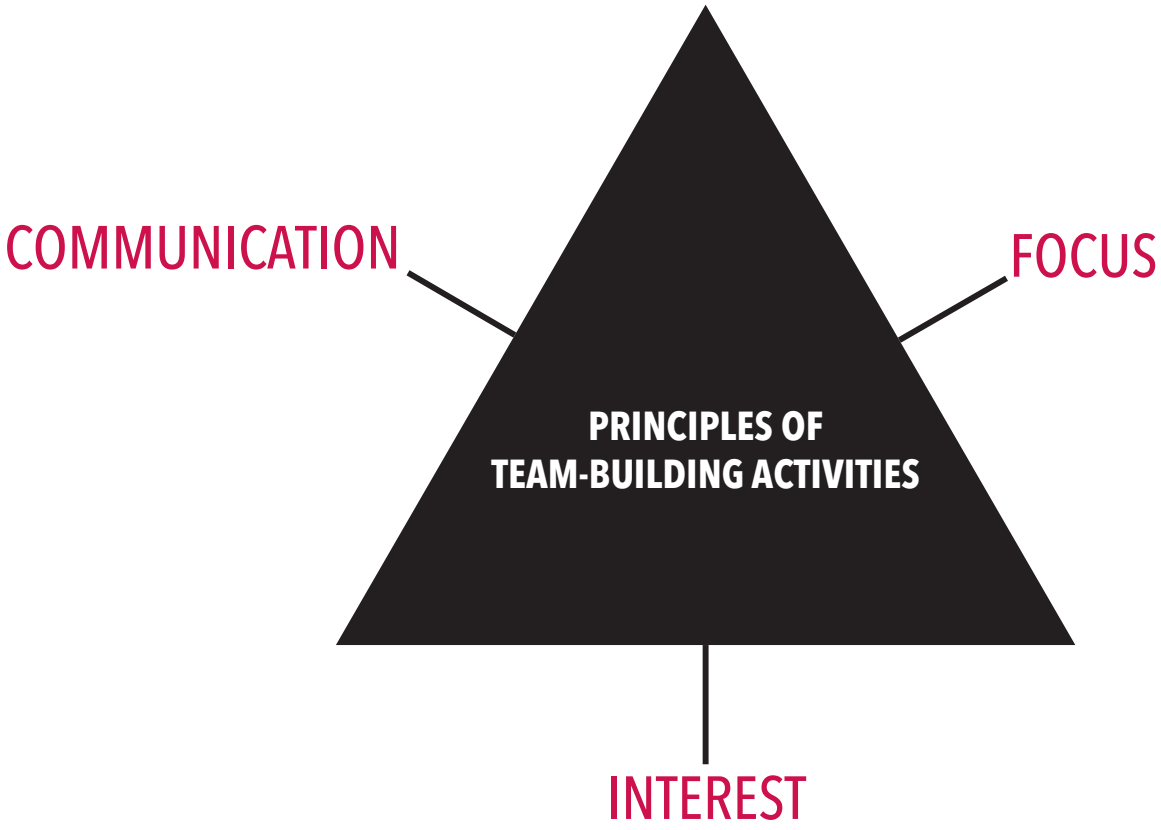
Puzzles
Design Criteria Met: Engage with team / collaborative, provides guidance / etiquette, Context-flexible

Challenge / Data Set Unlock
Design Criteria Met: Engage with team / collaborative, provides guidance / etiquette, personalized / customized

Data Analytics
Design Criteria Met: Easy access, context-flexible, equitable / non-competitive

4.3 Validating the Process and Tool

To ensure the IDFC process and Hackversation app address the need for team-building at hackathons, the process and tool are validated using the aforementioned Principles of Team-building Activities as reference: Communication, Focus, and Interest.



Communication

Process: The first two phases of the process, Introduce and Discover, focus on using communication as a tool for building camaraderie between potential team members. While the Introduce phase sparks the conversation between participants, the Discover phase allows participants to gain a better understanding of each other and begin to learn communication styles.

Tool: The Profile and Team Formation features of the Hackversation app prompt communication activities in two formats, visual and auditory. The visual aspect of the Profile allows participants to read about other hackathon participants, while the questions used during Team Formation allow participants to engage in dialogue with each other.

Focus

Process: The Form phase of the process allows hackathon participants to select team members that have similar challenge interests, skill sets, or traits.

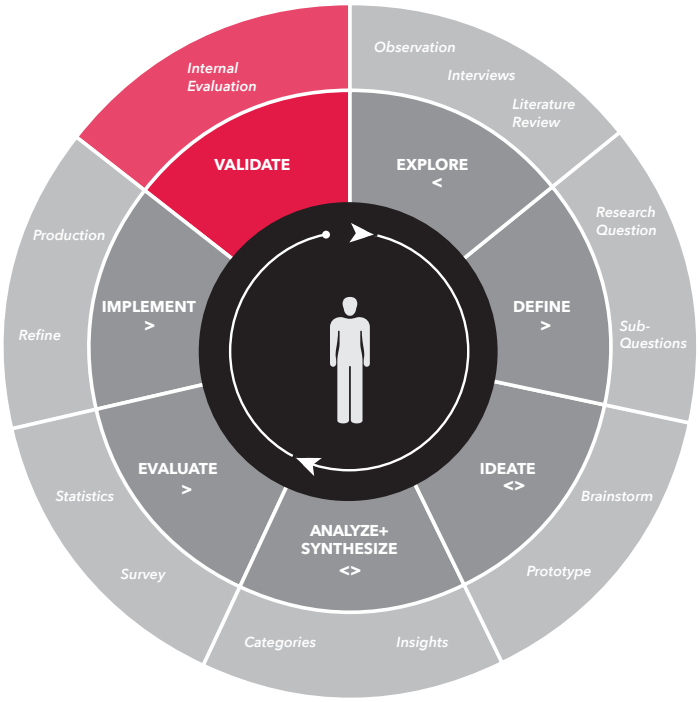
Tool: The Hackversation app feature Puzzles allows teams to collaborate on a specific puzzle while building team engagement.

Interest

Process: The Collaborate phase allows team members to bond and work together based on their selected hackathon challenge.

Tool: The Challenge / Data Set Unlock and Data Analytics features of Hackversation both address the Interest Principle. The Challenge / Data Set Unlock gives them access to the agreed upon hackathon challenge. The Data Analytics feature allows hackathon organizers to gain feedback on a participants' skills, characteristics and potential future team members based on similar topic interests.

In addition to validating the process and tool with the principles of team-building activities, the design researcher performed a self-evaluation of both, for further confirmation that the process and tool are appropriate outcomes for the intent of this research.



Self-Evaluation / Questions Answered

To self-evaluate the Hackversation app, the research questions were used as a foundation for evaluation. This process would ensure an apt process was followed and the outcome from the research conducted was a suitable match.

How might people-centered design enable participants with varying hackathon experiences create a process or tool for building relationships within hackathon teams?

Design research methods were performed to capture the ideas from research participants about processes and tools that could assist with building relationships at hackathons. The purpose of the process and tool was to assist with connecting people on a team, who previously had no interaction with each other. People-centered design research allowed the participants to engage with the design researcher and each other to solve a perceived challenge in the hackathon experience.

Research Sub-Questions

1. How might people-centered design be used to create a reflexive space for hackathon organizers and participants to share their experiences?

During participatory sessions, a relaxed studio environment provided the backdrop for participants to activate their creativity and reflect on their experiences at hackathons and team-building. Using the warm-up as a way to set the tone of being open to creativity allowed participants to fully engage in the people-centered design process.

2. How might hackathon organizers and participants create processes and tools for team-building?

Through the use of design research methods (i.e. brainstorming, forcing connections, prototyping, and evaluating), research participants were able to come up with ideas that would help to mitigate some of the barriers associated with team-building, or building relationships. By pairing up participants, each was able to bring their own distinct perspective on hackathons and what types of processes and tools they thought would be beneficial to people who would need a team or teams that were not as familiar with one another.

3. How might hackathon participants use the processes and tools to improve the quality of team performance?

The feedback that research participants provided focused on multiple areas that quality of team performance were dependent: communication, collaboration and commitment. The tool that resulted from this research addresses the first two, communication and collaboration, by sparking conversations between individuals and eventually leading to groups solving challenges together. In addressing these two pillars of team performance, it leads to the third: commitment. By creating a unique bond between team members, they are more likely to want to work with their team and see their ideas through to the best of their abilities.

5.0 DISCUSSION

5.1 Reflection
5.2 Future Research

5.1 Reflection

A goal of this research was to discover a new process and tool that could be used to integrate the experience of team bonding within a hackathon. While the process is a variation of the explored processes identified via literature review, the tools created during participatory sessions were based on ideas provided from participants. Understanding that many people who participate in hackathons are very tech-savvy, a digital process or tool may be something they prefer. That potentially being the case, it was still necessary to explore digital and non-digital tools to see which would best suit the messiness behind a team building experience at a hackathon.

A challenge that was not initially considered was the participants' own team-building experience during the participatory sessions. An ideal situation for the participatory sessions would have been to have all participants for each session and have multiple sessions. Having multiple sessions would have provided more time to form relationships within the research participants. Additional to research session team-building, scheduling proved to be a challenge, with participants work and personal schedules. Luckily, each session had an even number of participants so it was possible to pair everyone up and keep to the agenda planned.

As is the often the case in conducting people-centered design research, during research sessions, the presence of an assistant could have been an added benefit. The assistant would not be necessary to assist with keeping time or passing out worksheets, but rather to capture any session data from conversations that the design researcher would not be able to. The verbal information during a participatory session tends to be rich with additional ideas and insights that are helpful in research and understanding users. The recording of conversation could have also been achieved from the use of a recorder, for the design researcher to interpret post-session.

The use of current relationship-building techniques or games could have been a platform for piggybacking ideas and updating techniques that have already been proven to work. Modification of the techniques for a hackathon experience would meet the personalized and customized design criteria that the research participants identified. While this possibility would more than likely produced a much different process and

tool than the outcome of this research, it could have been incorporated as part of the agenda during the research sessions.

Capturing the concepts that were mentioned during research sessions, but not used, could have somehow been woven into the agenda so as not to lose the idea and have it fully developed. One such idea was having research participants fill out a profile that is akin to a trading card, so that all those involved in hackathons could see who is participating, what are their interests and skills sets applicable to the challenges.

Identifying Participants

Often, in studies using human subjects, a recruiting procedure is used to identify participants. Finding people who were knowledgeable or interested in the hackathon context and willing to be present for research sessions was difficult. The primary pool of participants was identified from the hackathon observation. Additional participants, those with an interest in hackathons, were sought from the university population.

Adhering to IRB Procedures

The institutional review board, or IRB, is the university ethics committee that insures that research conducted at the university does not violate the rights of the intended research subjects. People-centered design research is a methodology that requires flexibility and constant change. During participant conversations, it is often that valuable insights can change the course of the session agenda and alternate methods may be executed. This type of research does not fit within the format of the IRB. Thus, the difficulty in staying true to a people-centered design research process and requirements of the IRB led to delays in conducting participatory sessions, alluding back to the biggest challenge of this research: time.

5.2 Future research

Utilizing multiple design research methods is a way to extend this research and elicit more ideas for processes and tools. This could be beneficial for exploring alternative ways to meet the research objective. As a way to continue the innovation process, reworking the design research methods captures the repetitious cycle that leads to solutions that truly address the challenge.

The Hackversation app can be evaluated to ensure that it meets the needs of people looking to build relationships and teams at a hackathon. The feedback that participants would contribute would allow for the additional iterations of the app to be created. A digitized version of the app is another iteration that would be valuable, giving users the ability to click through the screens as they would on a fully developed version. Another future research consideration would be to develop the other prototype ideas and test them for their effectiveness with hackathon participants.
Although the focus of this research was purely based on the hackathon experience, the concept of a conversation starter can be transferable to multiple context where teams need to build relationships. Reflecting back to the interview with the healthcare IT project manager, reserving some time at the beginning of a project for team members to acquaint themselves could lead to better collaboration for the duration of a project. This refers back to the first step in the proposed team-building process: Introduce. To conserve time, only parts of the mobile application process can be applied to assist in building relationships within teams. If project managers have control over who can be selected for a project, they may be able to use the profile portion and form a team based on the skill sets needed to complete the project.

6.0 CONCLUSION

With hackathons becoming a much bigger phenomenon than merely for the pursuit of digital innovation, it is important to pull together the talented participants who often volunteer their time for whatever cause the hackathon supports. These participants range from seasoned code writers to inquisitive teachers and everyone in between. Varying processes and tools are necessary to allow relationship-building for those participants who are unfamiliar with the hackathon event process. People-centered design research is an ideal way to identify what would work best for the population of hackathon newbies who want to get involved.

People-centered design research, as reflected in this document, has the ability to create a space that allows people to reflect on all their team-building experiences and create solutions by brainstorming ideas and building prototypes. This co-creative participatory process is capable of being used to identify problems (particularly "wicked problems"), formulate and implement solutions appropriate for numerous contexts, for the hackathon experience is but one example.

This research was able to showcase how a people-centered design approach can be used as an innovative, participatory process, encompassing design research and design facilitation. Design research highlighted the selection and use of appropriate design research methods, such as ideating and prototyping, in participatory research sessions with volunteers who have varying interests in hackathons. Design facilitation showed by administering design research methods, the outcome can become an appropriate tool for building relationships. Overall, the proposed process model activates a constructive team-building process that is transferable to other contexts and is reflected in the features of a more refined iteration of the tool, Hackversation.

APPENDIX

IDEATION SESSION PLAN

March 14
Sally, Hackathon Organizer
Miley, Hackathon Newbie
David, Hackathon Newbie
Wendy, Hackathon Newbie

March 22
James Sallee, Hackathon Veteran
Jason Williams, Hackathon Veteran

Each research session was scheduled to last no longer than 2 hours. Below is a same agenda of what would be covered in each session:

1. Introduction, 5 minutes
2. Process Skills + Etiquette, 10 minutes
3. Warm-up, 10 minutes
4. Brainstorm #1, 5 minutes
5. Brainstorm #2, 5 minutes
6. Forced Connections, 10 minutes
7. Build Your Prototype, 15 minutes
8. Round Robin, 15 minutes
9. Questions + Answers, 5 minutes
10. Recap + Closing, 5 minutes

Interspersed between the previous agenda items will include transitional time and breaks.

The tools and supplies that were used during each research session were: Whiteboard, Dry erase markers, Worksheets, Whiteboard Markers, Permanent Markers and Sticky Notes.

RESEARCH SESSION WORKSHEETS

Process Skills + Etiqu

1. Collaboration etique
    a. Avoid jargo
    b. One perso
2. If you use Post-its, u
3. Write in all upper-ca
4. One idea per Post-it
5. No killer phrases (d
6. Parking lot (other id

ette

ette

on (acronyms!)

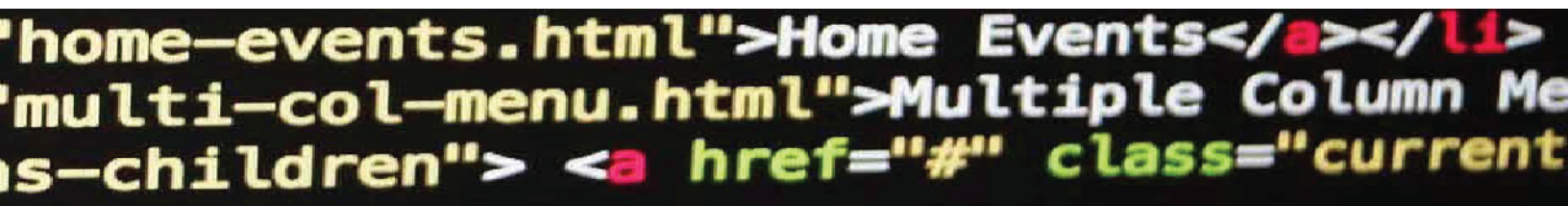
n speak at a time

se a Sharpie

se letters

on’t shoot down ideas)

eas you want to share)



Making Connections

Using of two design criteria we brainstormed, come up with some ideas for

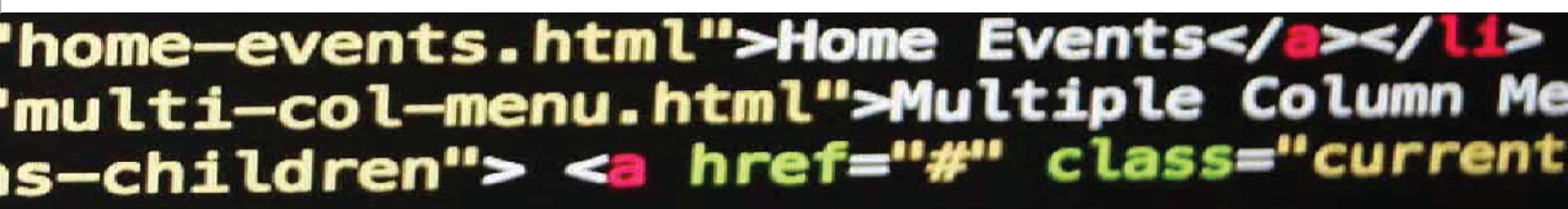
Design Criteria

#1 _____ #2 _____

a “widget” that would help participants connect with their team members.

Design Criteria

#1 _____ #2 _____



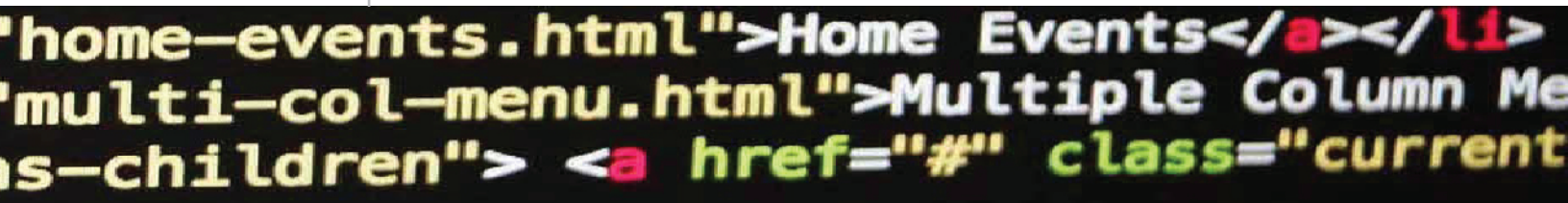
Widget Description

Please explain how people will use your “widget”. Write in detail how to

Description

o execute your "widget". Draw pictures to assist with your explanation!

Drawings



(Digital) Paper Prototyping

In the spirit of hackathons, you're going to create an app that will he

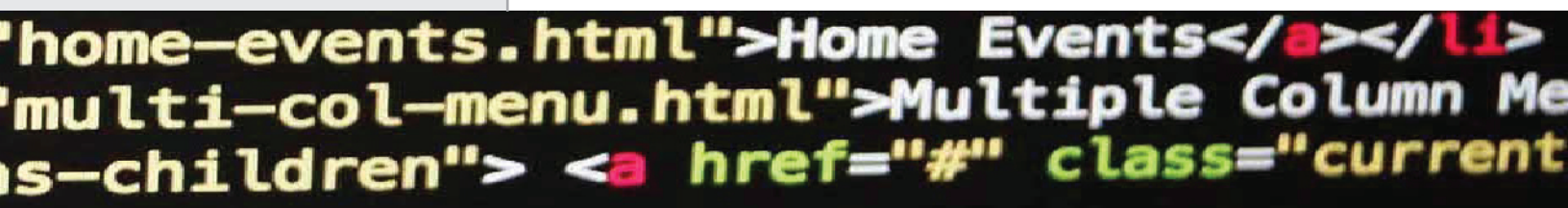
In this section, use one of the "widget" ideas to create your app. Use words and/or pictures to describe your app.

In this section, share reasons may not succeed. Please be s

elp hackathon participants build relationship within their teams.

s why you think the app idea specific for the app developer.

Based on the feedback in the gray section, make improvements on your app idea in this section. Remember to use words and/or pictures!

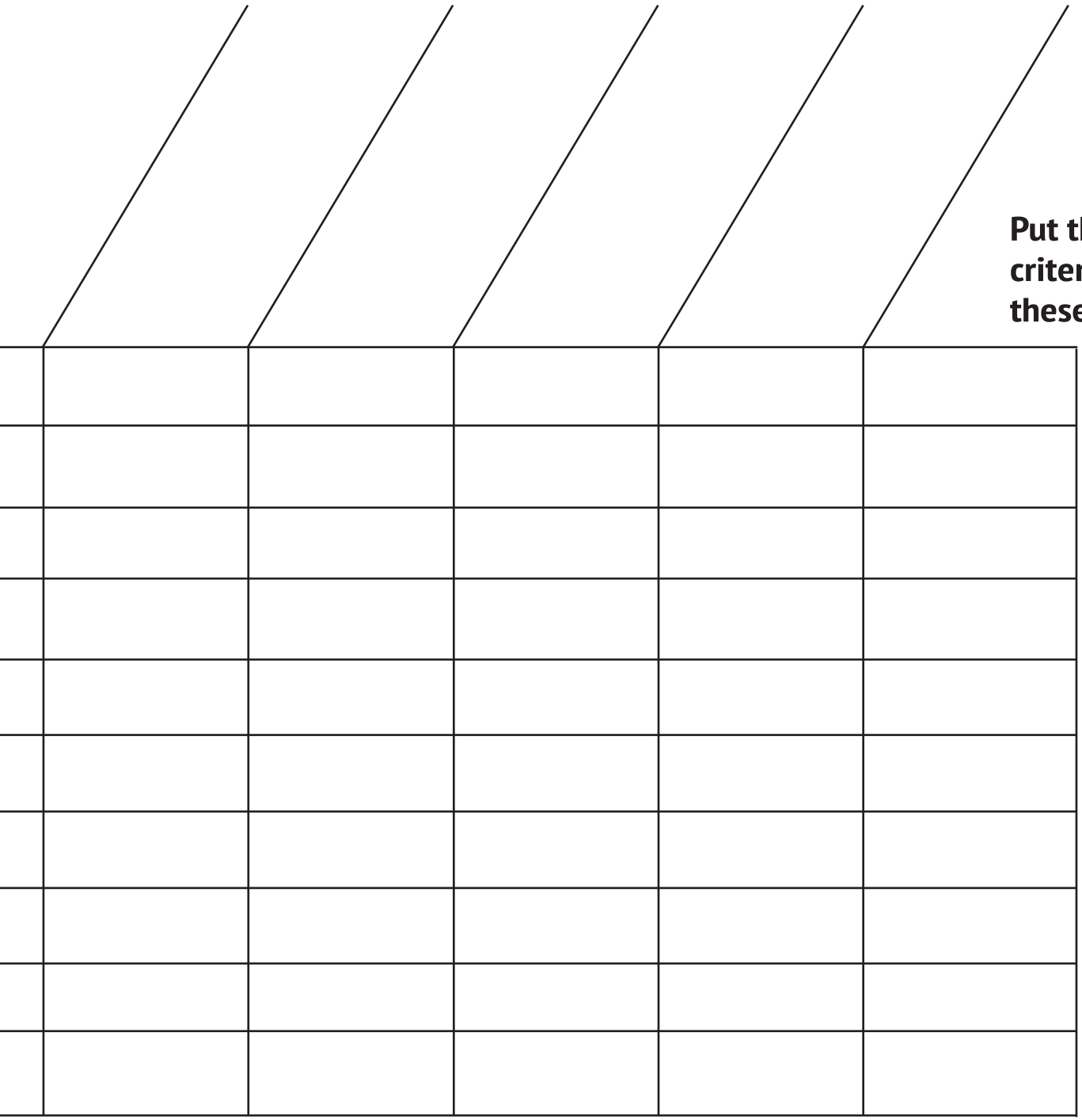


Criteria Matrix

Use an 'x' to show whether or not your "widget" fits the defined criteria. Evaluate all of the "widget" ideas that are not your own.

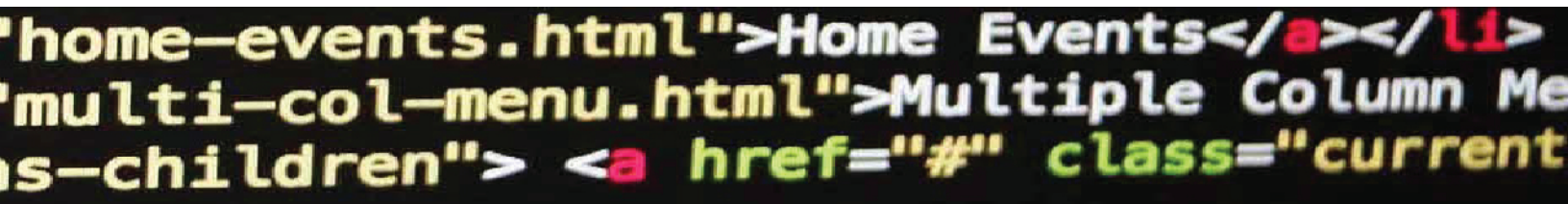
List the finalized "widget" ideas in these spaces

Calculate the total number of 'x's for each "widget" in the last column.



Put the criteria in these spaces!

TOTAL # of Xs in this column



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